9-2350-272-20/988

TM 9-2350-272-20

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TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE

CARRIER, CARGO, TRACKED, 1½ TON, M973 SMALL UNIT SUPPORT VEHICLE (SUSV)

(NSN 2350-01-132-9099)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
MARCH 1984

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CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 11 March 1988

ORGANIZATIONAL MAINTENANCE MANUAL
FOR
CARRIER, CARGO, 1-1/2 TON M973
SMALL UNIT SUPPORT VEHICLE (SUSV)
(NSN 2350-01-132-9099)

TM 9-2350-272-20, 14 March 1984, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

Remove Pages	Insert Pages
1-5 and 1-6	1-5 and 1-6
1-7/(1-8 blank)	1-7/(1-8 blank)
2-3 through 2-6	2-3 through 2-6
2-15 and 2-16	2-15 and 2-16
3-107 through 3-116	3-107 through 3-116
3-125 and 3-126	3-125 and 3-126
3-129 and 3-130	3-129 and 3-130
B-5 through B-8	B-5 through B-8
B-11 through B-16	B-11 through B-16
B-19 through B-22	B-19 through B-22

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, Organizational Maintenance requirements for Carrier, Cargo, Tracked, 1-1/2 Ton, M973.

WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure the safety of personnel whenever the personnel heater or main engine of the vehicle is operated for either maintenance purposes or tactical use.

(1) Do not operate heater or engine of vehicle in an enclosed area unless it is adequately ventilated.
(2) Do not idle engine for long periods without maintaining adequate ventilation in the personnel compartment.
(3) Do not drive the vehicle with inspection plates, cover plates, or access doors removed unless required for maintenance purposes.
(4) Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either is present, immediately ventilate personnel compartment. If symptoms persist, remove affected personnel from vehicle and treat as follows: Expose to fresh air; keep warm; do not permit physical exercise; if necessary administer artificial respiration (FM 21-11).

CLEANING SOLVENT

Cleaning solvent, federal specification P-D-680, Type II, is flammable and gives off harmful vapors. Use solvent only in a well-ventilated area. Avoid prolonged breathing of solvent vapors. Keep solvent away from flame. Do not use solvent in excessive amounts.

NBC

NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.

After Nuclear, Biological or Chemical (NBC) exposure of this vehicle all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots. All contaminated air filters shall be placed into double lined plastic bags and moved to a segregation area away from the work site swiftly. The same procedure applies for radioactive dust contamination; however, the Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operations Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP.

BATTERY SAFETY

Batteries can be dangerous if not handled properly. When working with batteries, use the following guidelines to insure your safety:

Wear rubber gloves and goggles when working with electrolyte.
Do not get electrolyte on your skin.
Electrolyte can cause serious skin burns.
When removing battery cables, disconnect both ground cables first.
When installing battery cables, connect ground cables last.
Ground cables must be disconnected prior to working on equipment where shorting of cables can occur.

BATTERY SAFETY - cont.

Always be sure that the correct cables go to the correct battery terminals. Incorrect cable installation is extremely dangerous.
Keep all tools away from batteries.
Do not smoke or have an open flame nearby while charging batteries.

REMOVING EXPANSION VESSEL CAP

Let engine cool completely. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant may result.

COMPRESSED AIR

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

ASBESTOS DUST

Do not use compressed air to clean asbestos dust from brake components. Asbestos dust is a hazard to your health.

LOOSE OR FRAYED CABLES

Always wear heavy gloves when you handle winch cables. Never let cable run through your hands; frayed cables can cut you.

SNAPPING WINCH CABLES AND SHIFTING LOADS

Keep personnel not involved in winching away from winch cables and payload. A snapping cable or shifting load can cause serious injury. Stop winching immediately if shifting payload presents a hazard or if any component fails. Refer to FM 20-22.

JACKING VEHICLE

Be sure that carrier is jacked and supported only at jacking or support points. Use of any other points may cause damage to carrier or it may slip and fall off the jacks, causing injury to personnel.

WORKING UNDER VEHICLE

Never work under carrier with only a jack supporting carrier. Weight of carrier must be supported by safety jacks or support stands with capacity greater than the weight of carrier.

EYE PROTECTION

Wear eye protection when performing the following maintenance:
Working under vehicle.
Cleaning with wire brushes.
When striking metal parts with hammer or chisel.
When welding or heating vehicle components.

STEERING UNIT

Keep personnel clear of carrier steering unit when separating or connecting carriers. Falling steering unit may cause injury to personnel.

ENGINE HEATER

Allow accessory heater to cool. Heater may be extremely hot. Serious burns and injury to personnel may result.

ENGINE OIL COOLER

Oil cooler cooling fins are extremely sharp. Be very careful when handling cooler to avoid cuts.

TECHNICAL MANUAL
NO. 9-2350-272-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 14 March 1984

ORGANIZATIONAL MAINTENANCE MANUAL CARRIER, CARGO, TRACKED, 1½ TON, M973 SMALL UNIT SUPPORT VEHICLE (SUSV) (NSN 2350-01-132-9099)

REPORTING OF ERRORS

You can help improve this publication. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication and Blank Forms), or DA Form 2028-2 located in the back of this publication direct to: US Army Tank-Automotive Command, ATTN: DRSTA-MBP, Warren, MI 48090. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

This manual is designed to help you maintain the M973 Cargo Carrier and accessory equipment. Listed below are special features which will help you locate the information you need:

Front cover table of contents for quick reference to important information.
An index to the manual contents is located in the final pages of this manual. Use the index to locate specific items of information.

Measurements in this manual are given in both English and Metric units.

A Metric to English conversion chart is also provided on the inside back cover of this manual.

Read all information found at the beginning of each task. It has important information and safety instructions you must follow before beginning the task.

Warning pages are located in the front of this manual. You should learn the warnings before operating or doing maintenance on the vehicle. Important warnings and cautions are also located on other pages in the manual. They appear before a step that may result in personnel injury or damage to equipment. If the instructions are not followed, or care is not taken, you may injure yourself. Notes are located before a step. Notes are provided to make the steps that follow easier. Always read all cautions, warnings, and notes before performing the next step.

Instructions on how to use the troubleshooting tables are located in paragraph 2-6.

Instructions on performing PMCS are located in paragraph 2-5.

TECHNICAL MANUAL
NO. 9-2350-272-20

HEADQUARTERS
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Washington, D.C., 14 March 1984

ORGANIZATIONAL MAINTENANCE MANUAL
CARRIER, CARGO, TRACKED, 1½ TON, M973
SMALL UNIT SUPPORT VEHICLE (SUSV)
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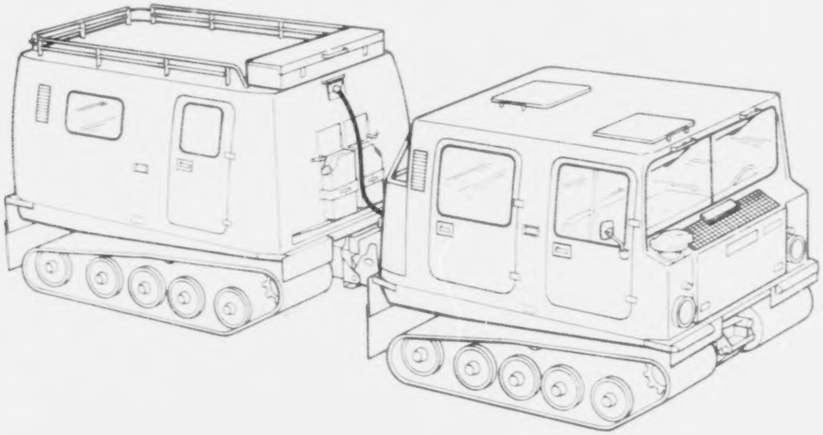
CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. This manual contains instructions for organizational maintenance for the M973 Cargo Carrier. A description of the vehicle and vehicle major components are also given in this manual.



CARRIER, CARGO, TRACKED, 1½ TON M973
RIGHT FRONT VIEW

b. Appendix A contains a list of technical references you can use to support the vehicle. Appendix B contains the Maintenance Allocation Chart (MAC). The MAC lists the maintenance tasks that you are authorized to perform.

c. This manual also lists the following information:

(1) Service upon receipt of vehicles

(2) Special tools and equipment

(3) Lubrication

(4) Preventive maintenance checks and service (PMCS)

(5) Troubleshooting the vehicle

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1-2. MAINTENANCE ALLOCATION.

Maintenance responsibilities will apply as shown in the MAC CHART, Appendix B. Your support maintenance unit should be informed when repairs are beyond the scope of organizational maintenance. Your support maintenance activitiy can provide the trained personnel, tools or other instructions needed.

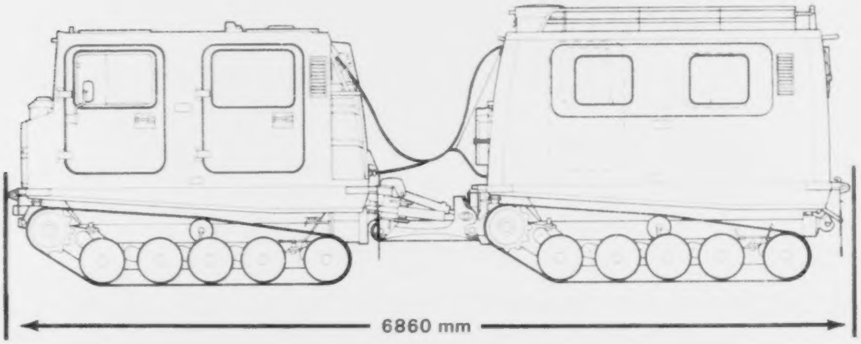
1-3. FORMS, RECORDS AND REPORTS.

a. Forms and Records.

Forms required to support the vehicles are listed in Appendix A. For a listing of all current forms, refer to DA PAM 310-1. DA PAM 738-750 authorizes forms required to maintain the vehicles.

b. Reporting Equipment Improvement Recommendations.

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at US ARMY TANK-AUTOMOTIVE COMMAND, ATTN: DRSTA-MP, Warren MI, 48090. We will send you a reply.



Overall Length	270.28 in (6860 mm)
Overall Height Front Car	90.62 in (2300 mm)
Overall Height Rear Car	94.56 in (2400 mm)
Overall Width	72.89 in (1850 mm)
Track Width	24.42 in (620 mm)
Distance Between Tracks	24.03 in (610 mm)

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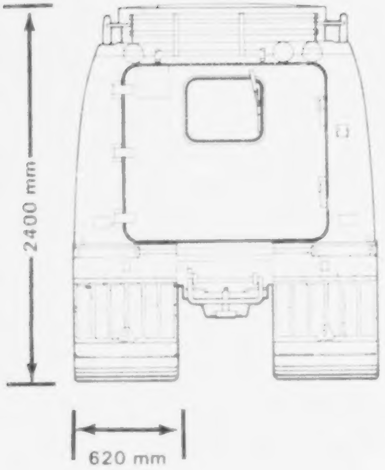

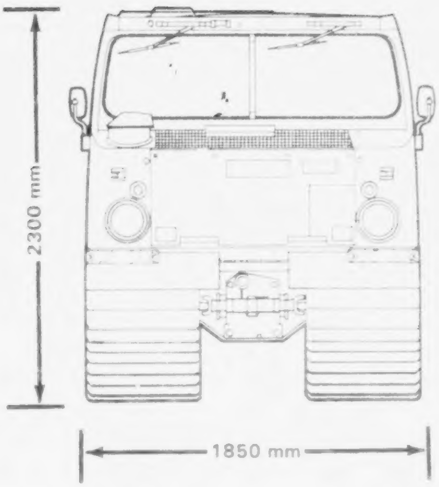

Shipping Cubage
Shipping Weight 2,927.27 lbs. (6440 KG)
Shipping Tonnage 1.46 Ton

1-4. METRIC SYSTEM.

Equipment and system is metric. Metric tools are required for equipment maintenance. Metric to English conversion tables are on inside back cover.

1-5. NOMENCLATURE CROSS REFERENCE.

All nomenclatures are standard U.S. Army.

1-6. ADMINISTRATIVE STORAGE.

TM 740-90-1 has information on administrative storage of vehicles.

1-7. DESTRUCTION TO PREVENT ENEMY USE.

Refer to TM 750-244-6.

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Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. DESCRIPTION.

a. Vehicle.

Description of vehicle and major component systems are given in TM 9-2350-272-10. The paragraphs and subparagraphs that follow give vehicle component descriptions.

b. Engine.

Drive train torque is provided by a Mercedes-Benz, water cooled, five cylinder in line turbocharged diesel engine.

(1) Engine Lubrication. The engine is lubricated by a forced oil circulation system. An oil pump pumps the oil through the oil cooler and oil filter into the lubrication system. If the oil filter becomes plugged, a bypass valve opens to allow oil to flow through the system. An oil pressure valve regulates oil pressure under all load conditions.

(2) Cold Start System. To guarantee the engine starting quickly even at extremely low outside temperatures, a cold start aid is provided. The cold start system has five glow plugs, one in the left side of each cylinder. The pressurized fuel is injected into the cylinders where the air has been preheated by the glow plugs.

c. Electric System.

(1) Batteries. Two 12-volt batteries for storage of electric power are installed under the left rear seat in the front car. Batteries are connected in series. In this manner there is an operating voltage of 24 volts.

(2) Fuses. The central electric fuse box is located on the front panel to the left of the steering wheel. A second fuse box is located on the left side of the operator's seat mount. The fuses protect the electrical system from overload.

d. Transmission.

The transmission is a Mercedes Model W4A018. It is a fully-automatic, 5 (4 forward, 1 reverse) speed planetary transmission which requires no conventional clutching and shifting.

(1) Torque Converter. The torque converter is a self-contained unit. The turbine rotates freely in the cover shell which is connected to the primary oil pump. The stator is mounted on a one-way roller clutch and prevents the oil flowing counter-to direction of the engine.

(2) Transmission. The transmission is bolted to the torque converter housing. Components are: Input shaft, intermediate shaft, hollow shaft, and output shaft, 2 compound planetary gear sets, 2 disc clutches as well as 3 brake drums with the respective brake bands. The individual elements of the planetary gear sets are held stationary by the brake bands. The entire planetary gear train is interlocked by means of a disc clutch. The govenor, secondary pump, and the modulation pressure transmitter are located in the rear housing. The hydraulic control system is the shift valve housing. It is secured to the transmission from below. The shift valve housing holds a number of pistons and valves. The pistons and valves are connected to each other by means of oil passages.

e. Transfer.

The transfer is mounted on the chassis beam at the rear of the front car. The transfer transfers power to both the front and rear car differentials. The transfer can be shifted into 3 positions. neutral, high and low to provide all terrain driving.

f. Brakes.

The carrier has two independant brake systems, a service brake and a parking brake.

(1) Service Brake. The hydraulic brake system is divided into two circuits. Each circuit operates its own brake caliper by pressing brake pads against the brake disc. The brake disc is mounted on the brake shaft in the transfer and is thus always mechanically connected to the final drive gears of the transfer. If a pressure difference develops between the two brake circuits, an electric contact in the warning valve is actuated and switches on the BRAKE CIRCUIT/PARKING BRAKE warning lamp.

(2) Parking Brake. The parking brake acts on the right brake caliper on the service brake. The calipers adjust automatically to wear. The parking brake is engaged mechanically by depressing the parking brake pedal. It is released by disengaging the latch mechanism. The BRAKE CIRCUIT/PARKING BRAKE warning lamp is ON when the parking brake is engaged.

g. Propeller Shafts.

Torque is transmitted from the engine to the steering pump by way of a damper and a propeller shaft. Torque is also transmitted from the transmission to transfer. Torque is then provided to the differentials by way of the transfer. The differentials provide torque to the front and rear car drive sprockets.

h. Steering.

The steering system consist of a hydraulic oil tank, pump, steering valve with steering shaft, servo valve, two steering cylinders, a steering unit, and hydraulic lines. The steering cylinders are hydraulically operated by the pump and steering valve. The design of the steering unit insures that the two cars will track perfectly.

i. Suspension.

The suspension system is the same on both the front and rear car. Track girders are connected to a center chassis beam with a flat spring located in the front and rear of the car. Eight swing arms are mounted in the rubber torsion bars of the track girder. Road wheels are mounted on the swing arms. Two road wheels are also mounted on the track tensioner. The track tensioner has an adjusting screw to adjust proper track tension. The track girder has a track support wheel mounted to the upper side to support the track. Two drive sprockets are mounted on the front of the track girder to drive the track. The endless track is made of rubber and reinforced by steel cross members. Guides are place inside the tracks to keep them in line.

j. Frame.

The frames of both cars are basically the same. The frame is made of a central chassis beam connected to the track girders with flat springs.

k. Tachometer.

Measures engine revolutions per minute (RPM). Source of the input is from the alternator which provides an alternating current (pulse). The pulse is transmitted from terminal W on the alternator through a wire to terminal W on the tachometer. The pulse energizes a transmitter in the tachometer which causes the indicator to measure engine RPM. Frequency of alternating current (pulse) is dependent upon engine speed.

CHAPTER 2
SERVICE AND TROUBLESHOOTING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL.

2-1. INSPECTING AND SERVICING THE VEHICLES.

a. Service.

Step 1. Lubricate vehicle as required by vehicle maintenance record. Refer to LO 9-2350-272-12.
Step 2. Check "V" belt tension. Refer to TM 9-2350-272-10.
Step 3. Check battery electrolyte specific gravity reading. Refer to TM 9-6140-200-14.
Step 4. Check oil level in engine, front and rear car differentials, transfer, transmission, steering reservoir, and brake master cylinder. Refer to LO 9-2350-272-12.
Step 5. Check torque of all propeller shaft flange bolts.

PROPELLER SHAFT	TIGHTENING TORQUE VALUE
Transmission-To-Transfer	55 lb ft (75 Nm)
Transfer-To-Differential	36 lb ft (49 Nm)
Differential-To-Drive Sprocket	96 lb ft (130 Nm)

Step 6. Check and adjust parking brake. Refer to paragraph 3-108.
Step 7. Check torque of steering system mounting bolts.

STEERING SYSTEM MOUNTING HARDWARE	TIGHTENING TORQUE VALVE
Hydraulic pump pulley nut	19 lb ft (25 Nm)
Hydraulic pump plugs	30 lb ft (40 Nm)
Hydraulic pump assembly screws	30 lb ft (40 Nm)
Filter housing,	15 lb ft (20 Nm)
Steering valve cover screws	19 lb ft (25 Nm)
Steering valve pressure relief valve	22 lb ft (30 Nm)
Steering unit mounting nuts	325 lb ft (440 Nm)
Steering bar, journals, screws	258 lb ft (350 Nm)

Step 8. Check torque of leaf spring mount bolts.

MOUNTING HARDWARE	TIGHTENING TORQUE VALUE
Leaf — spring chassis beam	236 lb ft (320 Nm)
Leaf spring — track girder	325 lb ft (440 Nm)

Step 9. Perform an initial vehicle road test. Refer to table 2-2 for road test.

b. Inspect the vehicle for missing hardware. Use TM 9- 2350-272-10 and TM 9-2350-272-24P to identify missing equipment.

c. Report the following conditions on the proper maintenance form or equipment record: Vehicle damage; unsatisfactory design of material; and missing hardware. Refer to DA PAM 738-750 to complete maintenance forms and records.

Section II. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

2-2. SPECIAL TOOLS AND EQUIPMENT.

Refer to TM 9-2350-272-10 for basic issue items authorized for use with the vehicles. Table 2-1 lists and illustrates special tool and equipment you need for the M973 vehicle maintenance. Use TM 9-2350-272-24P to request special tools and test equipment.

TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT

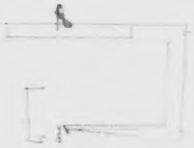
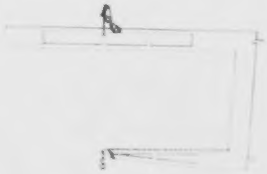
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
1	Syringe Set	112589007200 (4537785-019)	Remove Oil from Engine and Transmission	
2	Lifting Bar Kit	4537408-012 [5120-01-166-2088]	Replace Engine – Transmission Assembly	
3	Fixture, U-Bar	4537408-109 [4910-01-170-6691]	Lift Power Pack	
4	Lifting Bar	4537408-112 [4910-01-170-6680]	Lift Power Pack	

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TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

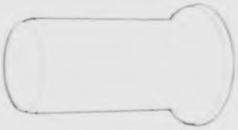
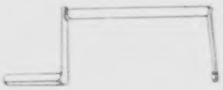
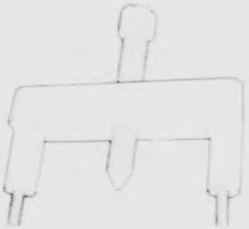
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
5	Handle	6899991-801 [5120-01-167-1774]	Used to Hold Drifts (Mandrels)	
6	Handle	6899992-000 [5120-01-167-1779]	Used to Hold Drifts (Mandrels)	
7	Drift Pin	4537408-040 (F1054-036910) [5120-01-164-5828]	Install Bearing on Transfer/Brake in Brake Unit	
8	Wrench	4537408-041 (F1053-021870) [5120-01-164-5796]	Replace Transfer/Brake Assembly	
9	Puller	4537408-045 (F1054-014640) [5120-01-166-1979]	Remove Brake Unit	
10	Deleted			
11	Adapter, Puller	4537408-034 (F1054-036940) [5120-01-166-1986]	Install Bearing	

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TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

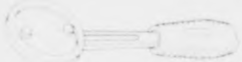
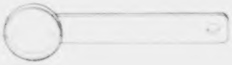
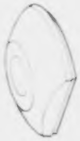
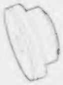
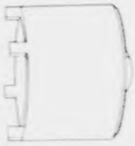
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
12	Wrench, Ratchet	4537408-035 (F1054-036990) [5120-01-166-2184]	Replace Brake Pads	
13	Wrench	4537408-036 (F1054-037870) [5120-01-166-2006]	Replace Brake Pads	
14	Adapter, Puller	4537408-038 (F1054-036930) [5120-01-166-2001]	Install Bearing Race	
15	Adapter	4537408-039 (F1054-036950) [5120-01-166-1997]	Remove Brake Assembly from Shaft	
16	Drift Pin	4537408-042 (F1054-036960) [5120-01-166-2090]	Install Bearing	
17	Wrench Spanner	4537408-043 (F1054-036980) [5120-01-166-2072]	Adjust Bearing Preload	

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TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

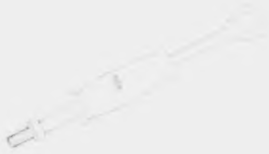
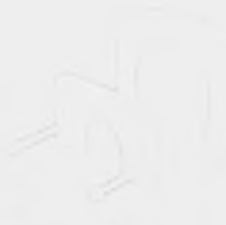
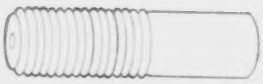
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
18	Deleted			
19	Puller	6899992-097 [5120-01-167-2000]	Remove Sprocket Shaft	
20	Puller	4537408-065 (F1053-021730) [5120-01-167-1780]	Remove Swing Arm	
21	Adjusting Tool	4537408-066 (F1054-036890) [5210-01-166-1977]	Adjust Swing Arm	
22	Adapter	4537408-067 (F1054-036370) [5120-01-166-2000]	Remove Sprocket Shaft Use with Item 19	

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TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

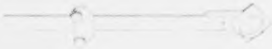
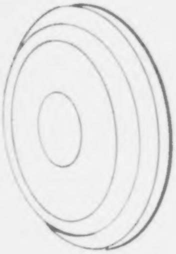
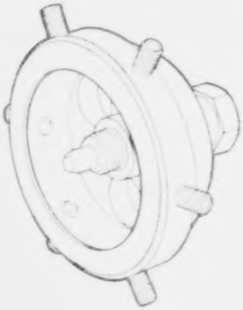
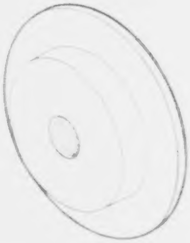
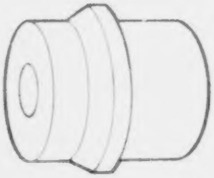
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
23	Rule	4537408-068 (F1052-014520) [5120-01-166-5281]	Adjust Swing Arm	
24	Drift Pin	4537408-070 (F1054-036360) [5120-01-167-7254]	Install Roadwheel Bearing	
25	Puller	4537408-073 (F1052-014350)	Remove Wheel	
26	Adapter	4537408-074 (F1053-021750) [5120-01-166-1975]	Replace Sprocket Bearings	
27	Spacer, Special Purpose	4537408-075 (F1054-036570) [5365-01-167-1694]	Replace Sprocket Bearings	 TA259166

TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

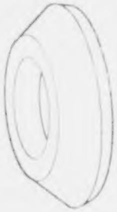
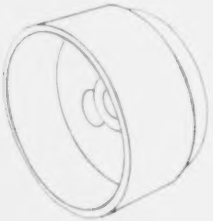
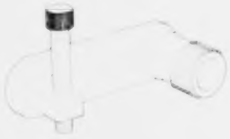
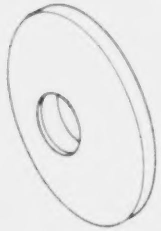
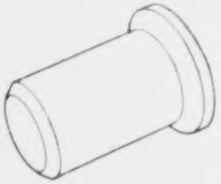
ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
28	Adapter	4537408-076 (F1053-021760) [5120-01-166-1976]	Replace Sprocket Bearings	
29	Sleeve	4537408-077 (F1053-021740) [5120-01-167-1695]	Replace Sprocket Bearings	
30	Adjusting Tool	4537408-078 (F1052-014380) [5120-01-166-1989]	Install Track Tension Bracket	
31	Puller	6899992-014	Install Wheel Bearing	
32	Puller	6899992-413	Install Bearing Race in Wheel	

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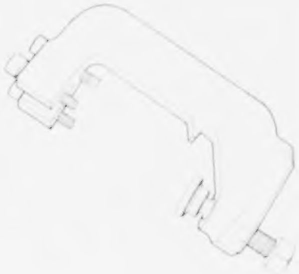
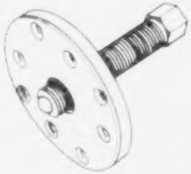
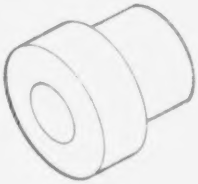
TABLE 2-1. SPECIAL TOOLS AND TEST EQUIPMENT (CONTINUED)

ITEM	NOMENCLATURE	PART NUMBER [NSN]	USE TO:	ILLUSTRATION
33	Puller	4537408-046 (F1053-021830) [5120-01-166-2155]	Repair Steering System	
34	Puller	6899992-261	Repair Hydraulic Steering System	
35	Drift Pin	4537408-052 (F1052-036790) [5120-01-166-2083]	Repair Steering System Cylinder	

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2-3. REPAIR PARTS.

Repair parts are listed in TM 9-2350-272-24P — Repair Parts and Special Tool List (RPSTL).

Section III. LUBRICATION INSTRUCTIONS.

2-4. GENERAL INFORMATION.

Special lubricating instructions for specific items are found in Chapter 3. Lubrication for these parts is explained during the repair of the components. Scheduled lubrication intervals can be found in LO 9-2350-272-12.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

2-5. GENERAL INFORMATION.

Continued vehicle operation can be insured by performing scheduled maintenance found in Table 2-2.

a. Do your (M) Preventive Maintenance once every month or 804 KM, whichever comes first.

Do your (Q) Preventive Maintenance once every three months or 2413 KM, whichever comes first.

Do your (S) Preventive Maintenance once every 6 months or 4827 KM, whichever comes first.

Do your (A) Preventive Maintenance once each year or 9654 KM, whichever comes first.

Do your (B) Preventive Maintenance once every two years or 19,308 KM, whichever comes first.

If something doesn't work, troubleshoot it with the instructions in your manual or notify your supervisor. Always do your Preventive Maintenance in the same order so it gets to be habit. Once you've had some practice, you'll spot anything wrong in a hurry. If anything looks wrong and you can't fix it, write it on your DA Form 2404. If you find something seriously wrong, report it to Direct Support Maintenance RIGHT NOW.

When you do your Preventive Maintenance, you will need to make all the checks. Take along a rag; you'll always need at least one.

WARNING

Dry cleaning solvent, used to clean parts, is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is: 138 °F(58.9 °C).

(1) Keep it clean: Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use cleaning solvent (appendix D, item 41) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) Bolts, nuts and screws: Check them all for obvious looseness, missing, bent or broken condition. You can't try them all with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it, or report it to Direct Support Maintenance if you cannot tighten it.

(3) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to Direct Support Maintenance.

(4) Electric wires and connectors: Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

(5) Hoses and fluid lines: Look for wear, damage leaks and make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to Direct Support Maintenance.

b.

It is necessary for you to know how the leakage affects the status of the vehicle. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your vehicle. Learn, then be familiar with them, and REMEMBER-WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR.

Leakage definition for PMCS:

CLASS I — Seepage of fluid (as indicated by wetness or discoloration) but not great enough to form drops.

CLASS II — Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

CLASS III — Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

Equipment operation is allowable with minor leakage (Class I or II). Report all Class III leaks to your supervisor immediately. Of course, consideration must be given to the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
							PRIOR TO ROAD TEST
							Perform all before operation checks listed in TM 9-2350-272-10 "Preventive Maintenance Checks and Services".
							DURING ROAD TEST
1			•			Starter	While starting vehicle, listen for unusual noises and difficult cranking of starter.
2			•			Engine and compartment	a. Listen for unusual noises, hesitations, and varying idle speed.
			•				b. Be alert for excessive vibration and the smell of fuel, oil, or exhaust.
3						Dials and indicators	Observe the following dials and indicators for proper operation:
			•				a. Brake Systems indicator light should not come on.
			•				b. Ammeter (Batteries). Indicator light should not come on.
			•				c. Tachometer. Should read 750-850 RPM, with engine idling.
			•				d. Engine Oil Pressure indicator light should not come on.
			•				e. Transmission Oil Temperature indicator light should not come on.
			•				f. Engine Coolant Temperature Gage should remain between 176°F-202°F (80°C-95°C) when engine is warmed up.

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
4						Vehicle Safety Devices	Observe the following items and their controls for security, ease of movement, and proper operation.
			●				a. Horn
			●				b. Windshield Wipers and Washers
			●				c. Seat Belts and Fasteners
			●				d. Turn Signals
			●				e. Panel Lights
			●				f. Headlights
			●				g. Stoplights
			●				h. Parking Lights
			●				i. Blackout Lights
							NOTE Road test vehicle for at least five miles (8 km) using all gears over varied terrain. This will provide ample time for detection of malfunctions.
5			●			Accelerator	Test for engine response to accelerator feed. Observe sticking or binding of accelerator pedal.
6			●			Brakes	a. Test braking response to brake pedal. Vehicle should slow down immediately.
			●				b. Reach a desired speed and lightly apply brake pedal with steady force. Vehicle should stop smoothly without noticeable chatter.
			●				c. After stopping vehicle and with transmission in first gear, release brake pedal. The brakes should release immediately and without difficulty.
			●				d. With vehicle on downgrade and transmission in neutral, engage parking brake. Vehicle should not move.

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
7						Steering	
			•				a. Check vehicle response to steering wheel action. Vehicle should respond instantly.
			•				b. Turn steering wheel to extreme left, then right, to detect hard steering.
			•				c. With vehicle on straight, level terrain, lightly hold steering wheel to detect pull.
8						Engine	
			•				a. Check engine operation at all speeds. Insure that engine does not exceed governed speed (5000 to 5200 RPM).
			•				b. Observe engine instruments to detect malfunctions.
			•				c. Be alert for unusual noises or smells.
9						Transmission	
			•				a. Check for response to shifting and smoothness of operation in all speed ranges.
			•				b. Be alert for unusual noises and difficulty in shifting in any speed range.
			•				c. Observe transmission instruments to detect malfunctions.
10						Suspension	
			•				a. Observe how vehicle responds to road shocks.
							AFTER ROAD TEST
			•				b. Inspect leaf springs for cracks.
			•				c. Inspect torsion bars, road wheel arms and road wheels for damage.
							d. Inspect road wheel arms 1 and 2 for correct adjustment (Refer to paragraph 3-120).

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
11					•	Transmission Fluid and Filter	Change transmission fluid and filter. Refer to paragraph 3-27 and 3-28.
12			•			Batteries	Check electrolyte level. Inspect battery cables for frays, splits, and security. Clean top of batteries and grease terminals. Refer to LO 9-2350-272-12 for proper grease.
13						Vehicle Exterior	Inspect the following items for completeness, security, operation, and readibility, as in the case of data plates:
			•				a. Glass
			•				b. Panels
			•				c. Storage Boxes
			•				d. Data, Caution, and Warning Plates
			•				e. Rubber, Plastic and Weather Strips.
			•				f. Steps
			•				g. Shackles

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
14						Track	
			•				a. Inspect for cracks, tears and correct adjustment. Refer to TM 9-2350-272-10 for adjusting track tension.
			•				b. Inspect for missing or bent track guide horns.

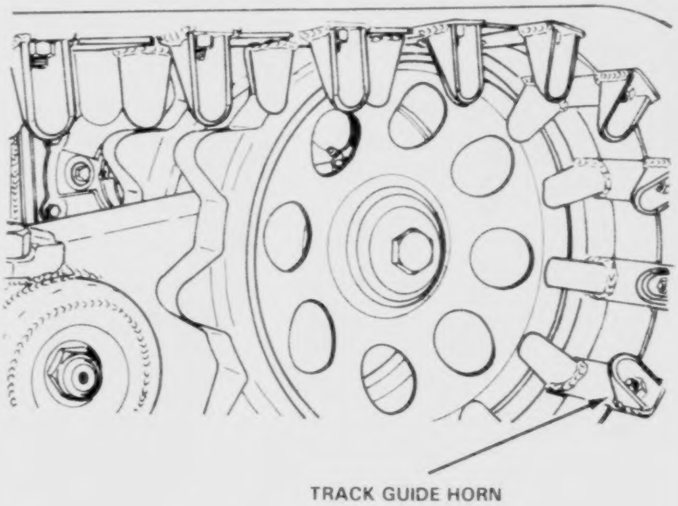

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

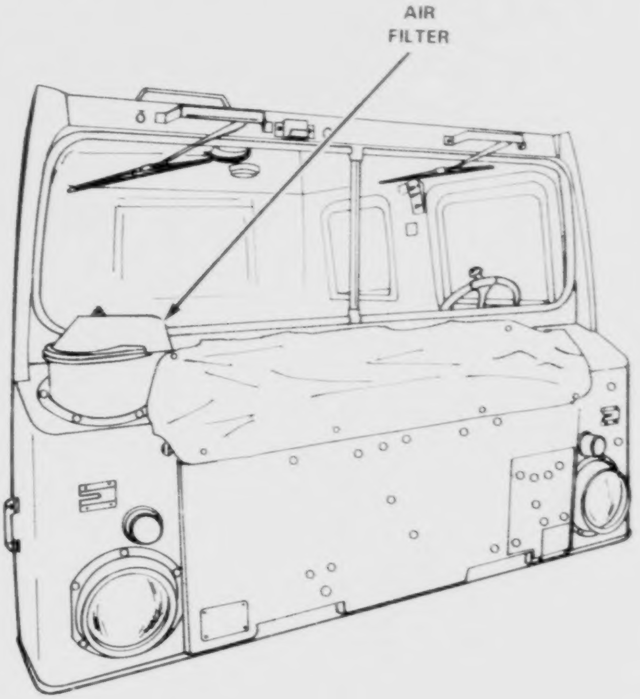
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
15						Air Intake System	
		•					a. Inspect air cleaner and hose for proper installation, cracks, breaks, and loose connections that could permit unfiltered air to enter the engine.
		•					b. Service air filter. Refer to paragraph 3-16. Inspect filter element for tears, or the presence of dirt and oil. Clean or replace as necessary.
		•					c. Inspect turbocharger for oil leaks and secure mounting.  TA259171

TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

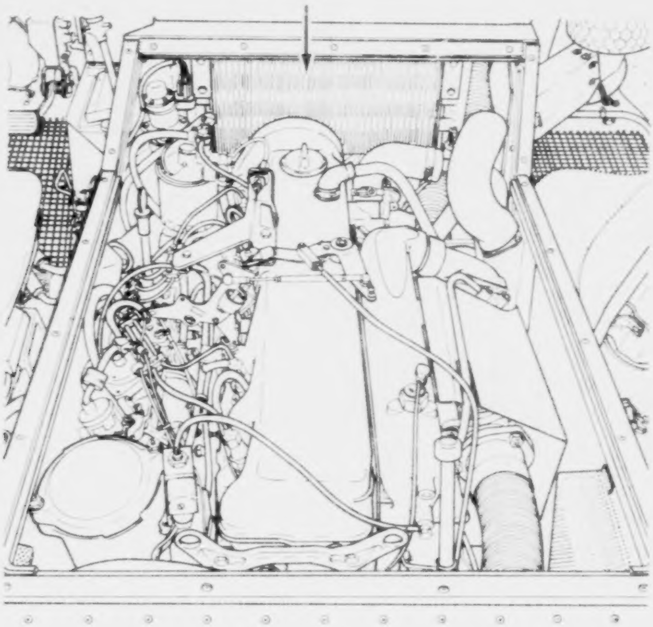
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
16				•		Cooling System	a. Check antifreeze protection level at expansion tank. Refer to TB 750-651.
				•			b. Inspect all hoses for security, splits, wear, and cracks that could cause leaks. Inspect hose clamps for serviceability.
				•			c. Inspect engine oil cooler, and radiator for leaks. **WARNING** Oil cooler cooling fins are extremely sharp. Be very careful when handling cooler to avoid cuts. 
				•			d. Inspect fan blades for cracks, loose or missing bolts.

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

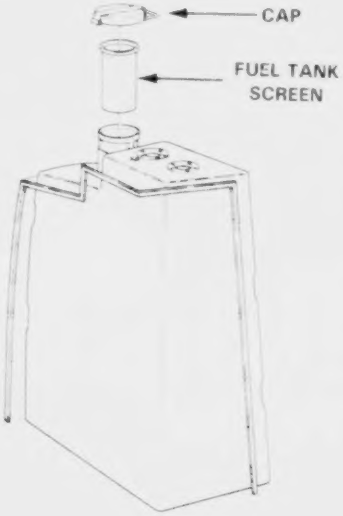
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
17						Fuel System	
			•				a. Service fuel sediment bowl. Refer to paragraph 3-12.
			•				b. Service in-line fuel filter. Refer to paragraph 3-8.
			•				c. Inspect fuel lines, hoses, and clamps for security, cracks and breaks that could cause leaks.
			•				d. Inspect fuel tank for damage. Check filler neck filter screen for tears or holes. 
18						Exhaust System	
				•			a. Check exhaust manifold, pipes and muffler for leaks.
				•			b. Check heat shield and exhaust system for secure mounting.
19						Hydraulic Brake System	
		•					a. Inspect all brake lines, hoses and fittings for cracks, rubbing and leaks.
		•					b. Check brake calipers for binding and leaks. Lubricate according to LO 9-2350-272-12.
	•						c. Inspect brake pads for wear. Check both sides of brake assembly.

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

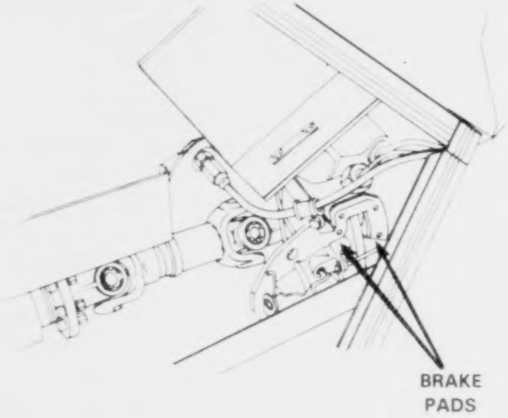
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
							
20						Transfer and Differentials	
		•					a. Inspect housings for cracks that could cause leaks.
		•					b. Insure housing plugs are present and secure.
		•					c. Inspect differential vents. Vents must not be plugged and must be securely mounted.

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

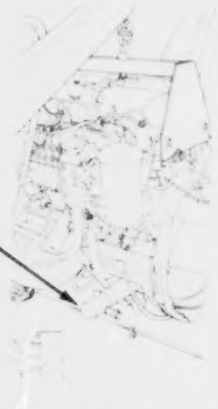
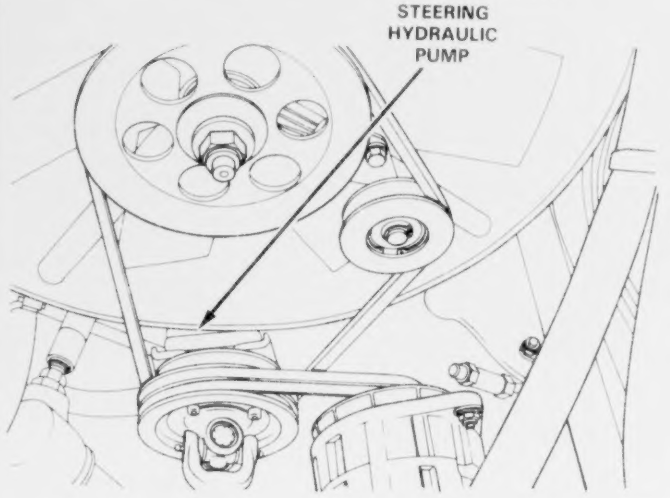
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
21				•		Transmission Oil Cooler	Inspect transmission oil cooler and hose for leaks. 
22			•			Propeller Shafts	Check universal joints for movement (play). There should be no movement in any direction. Check for loose or missing nuts and screws.
23						Steering system	
				•			a. Service steering hydraulic oil filter. Refer to paragraph 3-114.
			•				b. Inspect steering pump for cracks and leaks. 

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

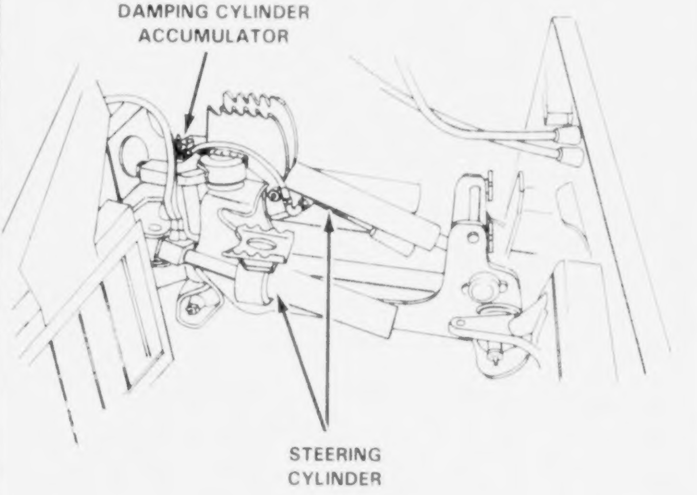
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
			•				c. Follow routing of all hydraulic steering lines, hoses, and tubes to inspect for loose fittings, cracks, bends, breaks, and leaks.
	•						d. Inspect steering cylinders and damping cylinder for secure mounting and leaks.
			•				e. Check damping cylinder accumulator. Correct pressure is 87 ± 14.5 PSI (600 ± 100 KP). Refer to LO 9-2350-272-12 for proper fluid.
							
24			•			Engine Oil Filter	Service engine oil filter. Refer to paragraph 3-4.

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TABLE 2-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES
M—MONTHLY Q—QUARTERLY S—SEMIANNUAL A—ANNUAL B—BIENNIAL

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED
	M	Q	S	A	B		
25						Winch	*WARNING* Always wear heavy gloves when you handle winch cables. Never let cable run through your hands; frayed cables can cut you.
				•			a. Inspect cable. Unwind cable from winch drum. Refer to TM 9-2350-272-10.
			•				b. Check winch brake for proper operation. Unlock winch drum. Snatch cable quickly. The winch drum should stop turning immediately.
			•				c. Inspect winch housing for cracks, and leaks.
			•				d. Check oil level and fill if necessary. Refer to LO 9-2350-272-12.
				•			e. Drain oil and refill. Refer to LO 9-2350-272-12.
26				•		Wiring Conduit	Inspect wiring harnesses for cracks, breaks and loose connections and mounting security.
27	•					Towing Pintle	Check operation of pintle hook. Inspect pintle and bracket for cracks, breaks, wear and mounting security.
28		•				Hatches, Hinges and Latches	a. Inspect roof hatches, hinges and latches for damage. Lubricate hinges and latches. Refer to LO 9-2350-272-12.
		•					b. Inspect sliding window latches for operation. Lubricate latches. Refer to LO 9-2350-272-12.
							FINAL ROAD TEST After all services and inspections have been completed, take vehicle on a short road test to make sure all corrections have been accomplished. Correct any defects or malfunctions that may occur during this test.

Section V. TROUBLESHOOTING INSTRUCTIONS

2-6. HOW TO USE TROUBLESHOOTING TABLES FAULT ISOLATION.

a. Troubleshooting is a logical way to find the cause of equipment failures. Many components are dependent on one another. Mechanical components are generally powered by electrical, pneumatic or hydraulic power. The fault may be electrical, pneumatic or hydraulic and appear to be mechanical. Follow the troubleshooting tables exactly.

b. Your manual cannot list all possible faults. Do the following procedures for problems not covered in the Tables. Identify the faulty system. Use test, measurement, and diagnostic test equipment to determine the defective component.

c. Section VI contains troubleshooting tables needed to fault isolate component failures. A symptom index is located at the beginning of troubleshooting table. The symptom index helps you locate fault symptoms quickly in each table.

d. The troubleshooting table has three columns of important information. The columns are explained below:

Column 1 — Lists the malfunction. The malfunction and malfunction number is in the symptom index for quick reference.

Column 2 — Lists the test or inspection.

Column 3 — Lists the corrective action needed.

e. How to troubleshoot.

Follow the steps below to troubleshoot.

NOTE

Perform all vehicle before operation checks before using this table. Refer to TM 9-2350-272-10.

Step 1. Locate the malfunction number in the symptom index.
Step 2. Read down the left column of the troubleshooting table. Find the number located in the index.
Step 3. Perform the tests or inspections listed.
Step 4. Perform the corrective action in the order listed.
Step 5. Notify your supervisor under these conditions.
- Malfunctions not listed.
- Malfunctions not corrected after the corrective action is completed.

NOTE

Malfunctions may have more than one probable cause. Complete all tests/inspections for each probable cause to find the correct cause.

Troubleshooting tables list corrective action for use by organizational maintenance.

Corrective actions beyond organizational maintenance responsibility are referred to direct support maintenance.

f. How to use component test procedures.

Component test procedures are shown before the removal and replacement procedures for the component.

(1) Follow all warnings, cautions, and notes during the tests.

(2) Follow the steps shown below for the test procedures.

Step 1. Locate the test number given in the troubleshooting table.
Step 2. Perform the steps in the test. Record a reading. Go back to the troubleshooting table. The test procedures tell you if the component is good or bad. The tables tell you when to replace components.

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TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE

1. ENGINE FAILS TO CRANK.

Step 1. Check batteries.
Refer to paragraph 3-89.
Step 2. Check battery cables.
Clean and tighten connections.
Step 3. Check start interlock switch at transmission
Test switch. Refer to paragraph 3-71.
Step 4. Check ignition switch.
Test switch. Refer to paragraph 3-80.
Step 5. Check starter motor for system voltage and ground potential.
Replace starter motor. Refer to paragraph 3-47.

2. ENGINE CRANKS BUT FAILS TO START.

Step 1. Check for fuel in fuel tanks.
Fill fuel tanks.
Step 2. Check for turned off fuel shut-off valve at left fuel tank.
Open fuel shut-off.
Step 3. Check air cleaner.
Replace air cleaner. Refer to paragraph 3-16.
Step 4. Check fuel sediment bowl. Refer to paragraph 3-11.
Clean and service fuel sediment bowl.
Step 5. Check for fuel line leaks.
Tighten loose connections.
Replace damaged fuel lines.
Step 6. Check fuel filter for restriction.
Replace fuel filter. Refer to paragraph 3-8.

3. ENGINE STARTS BUT DOES NOT RUN SMOOTHLY OR MISFIRES.

Step 1. Check for fuel line leaks.
Tighten loose connections.
Replace damaged fuel lines.
Step 2. Check fuel sediment bowl. Refer to paragraph 3-12.
Clean and service fuel sediment bowl.
Step 3. Check engine idle speed. Refer to paragraph 3-15.

4. ENGINE DOES NOT DEVELOP FULL POWER.

Step 1. Check accelerator linkage adjustment. Refer to paragraph 3-13.
Adjust accelerator linkage. Refer to paragraph 3-13.
Step 2. Check for fuel line leaks.
Tighten loose connections.
Replace damaged fuel lines.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Check fuel sediment bowl. Refer to paragraph 3-12.
Clean and service fuel sediment bowl.
Step 4. Check air cleaner.
Replace air filter. Refer to paragraph 3-16.

5. ENGINE USES TOO MUCH OIL.

Step 1. Check engine oil level (too high).
Correct engine oil level. Refer to LO 9-2350-272-12.
Step 2. Check engine for oil leaks.

6. LOW ENGINE OIL PRESSURE.

Step 1. Check engine oil level.
Add engine oil refer to LO 9-2350-272-12.
Step 2. Check engine oil sensor for leaks.
Tighten engine oil sensor. Refer to paragraph 3-69.
Replace damaged engine oil sensor. Refer to paragraph 3-69.
Step 3. Check engine oil sensor electrical connections.
Clean and tighten connections.

7. ENGINE OVERHEATS.

Step 1. Check, if engine cover is in place on front or rear grille.
Remove engine cover. Refer to TM 9-2350-272-10.
Step 2. Check engine coolant level. Refer to TM 9-2350-272-10.
Add coolant. Refer to TM 9-2350-272-10.
Step 3. Check cooling system for leaks.
Tighten loose connections
Replace leaking components.
Step 4. Check radiator for debris in cooling fins.
Clean out debris.
Step 5. Check radiator fan V-belt. Refer to paragraph 3-5.
Adjust fan drive belts. Refer to paragraph 3-5.
Replace damaged or missing fan drive belt. Refer to paragraph 3-5.
Bleed cooling system. Refer to paragraph 3-23.
Step 6. Check thermostat for damage.
Replace defective thermostat. Refer to paragraph 3-22.
Step 7. Flush cooling system. Refer to TB 750-651.
Fill with proper coolant. Refer to paragraph 3-23.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 8. Check for damaged radiator hoses.
Replace defective radiator hoses.
Step 9. Check radiator cap for damage.
Replace radiator cap.
Step 10. Check water pump for damage and looseness.
Replace water pump. Refer to paragraph 3-21.
Step 11. Check engine oil level.
Correct oil level. Refer to LO 9-2350-272-12.

8. ENGINE SMOKES EXCESSIVELY; BLACK SMOKE.

Step 1. Check air cleaner.
Replace air filter. Refer to paragraph 3-16.
Refer to direct support maintenance.
Step 2. Check turbocharger.
Replace defective turbocharger. Refer to paragraph 3-178.

DRIVE TRAIN MALFUNCTIONS

TRANSMISSION

1. TRANSMISSION OVERHEATS.

Step 1. Check transmission fluid level. Refer to LO 9-2350-272-12.
Add fluid. Refer to LO 9-2350-272-12.
Step 2. Check for transmission leaks.
Tighten loose lines and mounting hardware.
Step 3. Check transmission oil cooler for leaks.
Replace defective oil cooler.
Step 4. Check transmission filter for restriction.
Replace filter. Refer to paragraph 3-28.

2. TRANSMISSION DOES NOT SHIFT PROPERLY.

Step 1. Check transmission fluid level. Refer to LO 9-2350-272-12.
Add fluid. Refer to LO 9-2350-272-12.
Step 2. Check transmission shift linkage adjustment. Refer to paragraph 3-31.
Adjust transmission shift linkage. Refer to paragraph 3-31.
Step 3. Check accelerator linkage adjustment. Refer to paragraph 3-13.
Adjust accelerator linkage. Refer to paragraph 3-13.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. TRANSMISSION NOISY.

Step 1. Check transmission fluid level. Refer to LO 9-2350-272-12.
Add fluid. Refer to LO 9-2350-272-12.
Step 2. Check for transmission leaks.
Tighten loose lines and mounting hardware.
Step 3. Check for loose transmission mounting. Refer to paragraph 3-2.
Tighten mountings. Refer to paragraph 3-2.
Step 4. Check for loose universal joints.
Replace universal joints. Refer to paragraph 3-43.
Step 5. Check for loose or missing nuts and bolts from propeller shaft flanges.
Tighten propeller shaft flange nuts and bolts. Refer to paragraph 3-39.
Replace propeller shaft flange nuts and bolts. Refer to paragraph 3-39.

TRANSFER

4. TRANSFER OVERHEATS.

Step 1. Check oil level. Refer to LO 9-2350-272-12.
Fill transfer to proper level.
Step 2. Check for leaks.
Tighten plugs.
Refer to direct support maintenance.

5. TRANSFER DOES NOT SHIFT PROPERLY.

Check for loose or damaged shift rod or lever. Refer to paragraph 3-34 and 3-35.
Tighten shift rod and lever. Refer to paragraph 3-34 and 3-35.
Replace shift rod. Refer to paragraph 3-34.
Replace shift lever. Refer to paragraph 3-35.

6. TRANSFER NOISY.

Step 1. Check oil level. Refer to LO 9-2350-272-12
Add oil. Refer to LO 9-2350-272-12.
Step 2. Check for leaks.
Tighten plugs.
Refer to direct support maintenance.
Step 3. Check for loose mountings. Refer to paragraph 3-33.
Tighten mountings. Refer to paragraph 3-33.
Step 4. Check for loose universal joints.
Replace universal joints. Refer to paragraph 3-43.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 5. Check for loose or missing nuts and bolts from propeller shaft flanges.
Tighten propeller shaft flange nuts and bolts. Refer to paragraphs 3-39, 3-40 and 3-41.
Replace propeller shaft flange nuts and bolts. Refer to paragraphs 3-39, 3-40 and 3-41.

DIFFERENTIALS

7. DIFFERENTIAL OVERHEATS.

Step 1. Check oil level. Refer to LO 9-2350-272-12.
Add oil. Refer to LO 9-2350-272-12.
Step 2. Check for leaks.
Tighten plugs. Refer to LO 9-2350-272-12.

8. DIFFERENTIAL NOISY.

Step 1. Check oil level. Refer to LO 9-2350-272-12.
Add oil. Refer to LO 9-2350-272-12.
Step 2. Check for leaks.
Tighten plugs. Refer to LO 9-2350-272-12.
Step 3. Check for loose mountings. Refer to paragraphs 3-36 and 3-37.
Tighten mountings. Refer to paragraphs 3-36 and 3-37.
Step 4. Check for loose universal joints.
Replace universal joints. Refer to paragraph 2-43.
Step 5. Check for loose or missing nuts and bolts from propeller shaft flanges.
Tighten propeller shaft flange nuts and bolts. Refer to paragraph 3-40, 3-41 and 3-42.
Replace propeller shaft flange nuts and bolts. Refer to paragraph 3-40, 3-41 and 3-42.

ELECTRICAL SYSTEM MALFUNCTION

BATTERY SYSTEM

1. ENGINE CRANKS SLOWLY OR WILL NOT CRANK.

Step 1. Check batteries. Refer to paragraph 3-89.
Replace batteries. Refer to paragraph 3-75.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Check battery cables and terminals.
Clean and tighten battery cables and terminals.
Replace defective battery cables and terminals.

Step 3. Check starting solenoid circuit for continuity.
Clean and tighten wire terminal connections.
Replace starter motor. Refer to paragraph 3-47.

Step 4. Check ignition switch. Refer to paragraph 3-93.
Replace ignition switch. Refer to paragraph 3-64.

Step 5. Check transmission start interlock switch. Refer to paragraph 3-84.
Adjust or replace transmission start interlock switch. Refer to paragraph 3-85.

Step 6. Check fuses for corrosion and continuity.
Clean corroded fuses.
Replace defective fuses.

2. ENGINE CRANKS BUT FAILS TO START (ENGINE COLD).

Step 1. Check fuse F33 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

Step 2. Check glow/stop switch. Refer to paragraph 3-90.
Replace defective switch.

Step 3. Check glow plug relay. Refer to paragraph 3-95.
Replace or repair wiring and terminals.
Replace relay K18. Refer to paragraph 3-64

3. NO ELECTRICAL POWER TO SUBSYSTEMS, WITH IGNITION SWITCH IN ANY POSITION.

Step 1. Check batteries. Refer to paragraph 3-89.
Replace batteries. Refer to paragraph 3-75.

Step 2. Check battery cables and terminals.
Replace defective battery cables and terminals.

Step 3. Check fuses for corrosion and continuity.
Clean corroded fuses.
Replace defective fuses.

Step 4. Check main switch relay. Refer to paragraph 3-94.
Clean and tighten wire terminal connections.
Replace main switch relay. Refer to paragraph 3-61.

Step 5. Check ignition switch. Refer to paragraph 3-93.
Replace ignition switch. Refer to paragraph 3-64.

Step 6. Check circuit wiring, terminals and connector plugs for continuity.
Repair defective wiring.
Clean and tighten terminals.
Clean and make a firm plug connection.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

CHARGING SYSTEM

4. BATTERY INDICATOR REMAINS LIT AFTER ENGINE IS STARTED.

Step 1. Check alternator for loose or broken V-belts. Refer to TM 9-2350-272-10.
Adjust V-belts. Refer to paragraph 3-5.
Replace V-belts. Refer to paragraph 3-5.
Step 2. Check circuit wiring for continuity.
Clean and tighten wire connections.
Step 3. Check alternator. Refer to paragraph 3-83.
Replace alternator. Refer to paragraph 3-46.

5. BATTERY INDICATOR DOES NOT LIGHT WITH IGNITION SWITCH ON.

Step 1. Check battery indicator bulb. Refer to paragraph 3-88.
Replace bulb. Refer to paragraph 3-64.
Step 2. Check circuit wiring for continuity.
Repair circuit wiring.
Clean and tighten terminal connections.
Step 3. Check alternator. Refer to paragraph 3-83.
Replace alternator. Refer to paragraph 3-46.

6. BATTERY INDICATOR LIGHTS DIMLY OR INTERMITTENTLY; TACHOMETER OPERATES ERRATICALLY.

Step 1. Check alternator for loose V-belts. Refer to TM 9-2350-272-10.
Adjust V-belts. Refer to paragraph 3-5.
Step 2. Check for loose or broken circuit wiring.
Clean and tighten connections.
Step 3. Check fuse F16 for corrosion.
Clean corroded fuse.
Step 4. Check alternator. Refer to paragraph 3-83.
Replace alternator. Refer to paragraph 3-46.

LIGHTING AND ACCESSORY SYSTEM

7. HEADLIGHTS DO NOT OPERATE IN HIGH BEAM OR LOW BEAM.

Step 1. Check blackout light switch. Refer to TM 9-2350-272-10.
Replace defective switch. Refer to paragraph 3-62.
Step 2. Check directional switch. Refer to paragraph 3-87.
Replace defective directional switch. Refer to paragraph 3-58.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Check light switch. Refer to paragraph 3-91.
Replace defective light switch. Refer to paragraph 3-64.
Step 4. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

8. HEADLIGHTS ONLY OPERATE IN EITHER HIGH BEAM OR LOW BEAM.

Step 1. Check directional switch. Refer to paragraph 3-87.
Replace defective directional switch. Refer to paragraph 3-58.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

9. ONE HEADLIGHT DOES NOT LIGHT; HIGH BEAM OR LOW BEAM. LEFT OR RIGHT SIDE.

Step 1. Check fuses F9, F10, F11, and F12 for corrision and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check headlight. Refer to paragraph 3-88.
Replace defective headlight. Refer to paragraph 3-48.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

10. HIGH BEAM INDICATOR DOES NOT LIGHT WHEN HIGH BEAMS ARE ON.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check indicator bulb. Refer to paragraph 3-88.
Replace defective bulb. Refer to paragraph 3-66.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

11. PARKING, MARKER LIGHTS, AND LEFT REAR TAIL LIGHT DOES NOT LIGHT.

Step 1. Check fuse F6 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

12. PARKING LIGHT DOES NOT LIGHT.

Step 1. Check light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-52.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

13. MARKER LIGHT DOES NOT LIGHT.

Check light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-54.

14. LEFT REAR TAIL LIGHT DOES NOT LIGHT.

Step 1. Check fuse F6 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-54.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

15. SERVICE BRAKELIGHTS DO NOT OPERATE.

Step 1. Check blackout light switch for correct position.
Refer to TM 9-2350-272-10.
Step 2. Check fuse F1 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 3. Check brake light warning switch. Refer to paragraph 3-98.
Replace defective brake light warning switch. Refer to paragraph 3-44.
Step 4. Check circuit wiring for continuity.
Replace or repair defective wiring and terminals.

16. ONE SERVICE BRAKELIGHT DOES NOT LIGHT.

Step 1. Check light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-54.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

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17. SERVICE BRAKELIGHTS DO NOT OPERATE; BLACKOUT BRAKELIGHTS OPERATE, OR BLACKOUT BRAKELIGHTS DO NOT OPERATE; SERVICE BRAKELIGHTS OPERATE.

Step 1. Check blackout light switch. Refer to paragraph 3-90.
Replace defective blackout light switch. Refer to paragraph 3-62.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

18. TRAILER RECEPTACLE INOPERATIVE, AND BLACKOUT LIGHTS DO NOT LIGHT.

Step 1. Blackout lights only—check blackout light switch. Refer to TM 9-2350-272-10.
Replace defective switch. Refer to paragraph 3-62.
Step 2. Check fuse F8 for corrosion and continuity.
Clean Corroded fuse.
Step 3. Check blackout light bulb. Refer to paragraph 3-88.
Replace defective bulb. Refer to paragraph 3-52.
Step 4. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

19. RIGHT REAR TAIL LIGHT DOES NOT LIGHT.

Step 1. Check fuse F7 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-52.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

20. BACK UP LIGHT AND INSTRUMENT LIGHTING DOES NOT LIGHT.

Step 1. Check fuse F5 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check curcuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

21. BACK UP LIGHT DOES NOT LIGHT.

Step 1. Check fuse F5 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Step 3. Check backup light switch for continuity.
Replace defective back up light switch.
Step 4. Check light bulb. Refer to paragraph 3-88.
Replace defective bulb. Refer to paragraph 3-52.

22. INSTRUMENT LIGHTING DOES NOT LIGHT.

Step 1. Check fuse F5 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace and repair defective wiring and terminals.
Step 3. Check instrument panel rheostat. Refer to paragraph 3-96.
Replace defective rheostat. Refer to paragraph 3-64.
Step 4. Check light bulbs. Refer to paragraph 3-88.
Replace defective light bulbs. Refer to paragraph 3-64.

23. INTERCOM, MAP READING LAMP, 24 VOLT POWER OUTLETS, AND GEAR SELECTOR LIGHTS INOPERATIVE.

Step 1. Check fuse F4 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace and repair defective wiring and terminals.

24. INTERCOM INOPERATIVE.

Step 1. Check fuse F4 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace and repair defective wiring and terminals.
Step 3. Check intercom switch. Refer to paragraph 3-90.
Replace defective switch.

25. MAP READING LAMP DOES NOT LIGHT.

Step 1. Check fuse F4 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Check map light bulb. Refer to paragraph 3-88.
Replace defective bulb. Refer to paragraph 3-53.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Step 4. Check map reading lamp switch for continuity.
Replace defective map lamp. Refer to paragraph 3-53.

26. 24 VOLT POWER OUTLETS INOPERATIVE.

Step 1. Check fuse F4 or F8 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

27. GEAR SELECTOR LIGHTS DO NOT LIGHT.

Step 1. Check fuse F5 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Step 3. Check gear selector light bulbs. Refer to paragraph 3-88.
Replace defective light bulbs.

28. CIRCULATING PUMP AND BILGE PUMP DO NOT OPERATE.

Step 1. Check fuse F3, for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.

29. CIRCULATING PUMP DOES NOT OPERATE.

Step 1. Check fuse F3 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.
Replace circulating pump. Refer to paragraph 3-74.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

30. BILGE PUMP FRONT OR REAR CAR DOES NOT OPERATE.

Step 1. Check fuse F3 for corrosion and continuity.
  Clean corroded fuse.
  Replace defective fuse.
Step 2. Check switch. Refer to paragraph 3-90.
  Replace defective switch.
Step 3. Check circuit wiring and terminals for continuity.
  Replace or repair wiring and terminals.
  Replace bilge pump; front car. Refer to paragraph 3-71.
  Replace bilge pump; rear car. Refer to paragraph 3-73.

31. DIRECTIONAL INDICATORS AND CABIN LIGHTS INOPERATIVE.

Step 1. Check fuse F2 for corrosion and continuity.
  Clean corroded fuse.
  Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
  Replace or repair wiring and terminals.

32. DIRECTIONAL INDICATORS DO NOT OPERATE.

Step 1. Check fuse F2 for corrosion and continuity.
  Clean corroded fuse.
  Replace defective fuse.
Step 2. Check directional switch. Refer to paragraph 3-87.
  Replace defective switch. Refer to paragraph 3-58.
Step 3. Check circuit wiring and terminals for continuity.
  Replace or repair wiring and terminals.
  Replace flasher.

33. CABIN LIGHT DOES NOT LIGHT.

Step 1. Check fuse F2 for corrosion and continuity.
  Clean corroded fuse.
  Replace defective fuse.
Step 2. Check light bulb. Refer to paragraph 3-88.
  Replace defective bulb. Refer to paragraph 3-54.
Step 3. Check circuit wiring and terminals for continuity.
  Replace or repair wiring and terminals.
  Replace cabin light assembly. Refer to paragraph 3-56.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

34. INSTRUMENTS, INDICATOR LAMPS, AND 1ST GEAR INOPERATIVE.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.

35. SPEEDOMETER OR ODOMETER DOES NOT OPERATE, OTHER INSTRUMENTS OPERATE.

Step 1. Check circuit wiring and terminal for continuity.
Replace or repair wiring and terminals.
Replace speedometer. Refer to paragraph 3-66.

Step 2. Check speedometer sensor. Refer to paragraph 3-67.
Replace defective sensor. Refer to paragraph 3-67.

36. SPEEDOMETER FLUCTUATES.

Step 1. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.
Step 2. Check adjustment of speedometer sensor. Refer to paragraph 3-67.
Adjust sensor. Refer to paragraph 3-67.
Replace defective sensor. Refer to paragraph 3-67.

37. BRAKE CIRCUITS/PARKING BRAKE INDICATOR INOPERATIVE.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check indicator light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-66.
Step 3. Check parking brake switch. Refer to paragraph 3-86.
Replace defective switch. Refer to paragraph 3-45.
Step 4. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.
Replace master cylinder. Refer to paragraph 3-100.

38. TURN SIGNAL INDICATOR (CARRIER OR TRAILER) INOPERATIVE.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- **Step 2**. Check indicator light blub. Refer to paragraph 3-88.
  - Replace defective light bulb. Refer to paragraph 3-66.
- **Step 3**. Check light bulbs.
  - Replace defective or incorrect bulb.
- **Step 4**. Check directional switch. Refer to paragraph 3-87.
  - Replace defective switch. Refer to paragraph 3-58.
- **Step 5**. Check circuit wiring and terminals for continuity.
  - Replace or repair defective wiring and terminals.
  - Replace flasher.

39. ENGINE OIL PRESSURE INDICATOR INOPERATIVE.

- **Step 1**. Check fuse F16 for corrosion and continuity.
  - Clean corroded fuse.
  - Replace defective fuse.
- **Step 2**. Check indicator light bulb. Refer to paragraph 3-88.
  - Replace defective light bulb. Refer to paragraph 3-66.
- **Step 3**. Check circuit wiring and terminals for continuity.
  - Replace or repair defective wiring and terminals.
  - Replace engine oil sensor. Refer to paragraph 3-69.

40. BILGE PUMP INDICATOR INOPERATIVE.

- **Step 1**. Check fuse F16 for corrosion and continuity.
  - Clean corroded fuse.
  - Replace defective fuse.
- **Step 2**. Check indicator light bulb. Refer to paragraph 3-88.
  - Replace defective light bulb. Refer to paragraph 3-64.
- **Step 3**. Check bilge pump switch. Refer to paragraph 3-90.
  - Replace bilge pump switch.
- **Step 4**. Check bilge pump switch. Refer to paragraph 3-90.
  - Replace bilge pump switch.

41. ALTERNATOR INDICATOR INOPERATIVE.

- **Step 1**. Check fuse F16 for corrosion and continuity.
  - Clean corroded fuse.
  - Replace defective fuse.
- **Step 2**. Check indicator light bulb. Refer to paragraph 3-88.
  - Replace defective light bulb. Refer to paragraph 3-64.
- **Step 3**. Check circuit wiring and terminals for continuity.
  - Replace or repair wiring and terminals.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

42. INTERCOM INDICATOR INOPERATIVE.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check indicator light bulb. Refer to paragraph 3-88.
Replace defective light bulb. Refer to paragraph 3-64.
Step 3. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.

43. 1ST GEAR SWITCH (AUTOMATIC TRANSMISSION) INOPERATIVE.

Step 1. Check fuse F16 for corrosion and continuity.
Clean corroded fuse
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Replace automatic transmission 1st gear switch. Refer to paragraph 3-92.

44. WINDSHIELD WIPERS, HORN, AND WINDSHIELD WIPERS INOPERATIVE.

Step 1. Check fuse F15 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.

45. WINDSHIELD WIPERS INOPERATIVE.

Step 1. Check fuse F15 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.
Step 2. Check directional switch. Refer to paragraph 3-87.
Replace defective switch. Refer to paragraph 3-58.
Step 3. Check circuit wiring and terminals for continuity.
Replace and repair defective wiring and terminals.
Replace K3 relay. Refer to paragraph 3-64.
Replace windshield wiper motor. Refer to paragraph 3-60.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

46. HORN INOPERATIVE.

Step 1. Check fuse F15 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

Step 2. Check circuit wiring and terminals for continuity.
Replace or repair wiring and terminals.
Replace horn assembly. Refer to paragraph 3-59.

47. WINDSHIELD WASHER INOPERATIVE.

Step 1. Check fuse F15 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

Step 2. Check directional switch. Refer to paragraph 3-87.
Replace defective switch. Refer to paragraph 3-58.

Step 3. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Replace windshield washer pump motor.
Replace windshield washer tubing.

48. HEATER FAN (FRONT OR REAR CAR) INOPERATIVE.

Step 1. Check fuse F14 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

Step 2. Check heater fan switch for continuity.
Replace fan switch.

Step 3. Check circuit wiring and terminals for continuitv.
Replace or repair defective wiring and terminals.
Replace front car heater fan motor. Refer to paragraph 3-77.
Replace rear car heater fan motor. Refer to paragraph 3-79.

49. BATTERY HEATER INOPERATIVE.

Step 1. Check fuse F13 for corrosion and continuity.
Clean corroded fuse.
Replace defective fuse.

Step 2. Check circuit wiring and terminals for continuity.
Replace or repair defective wiring and terminals.
Replace K9 relay.
Replace battery heater sensor.
Replace battery heater. Refer to paragraph 3-76.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

BRAKE SYSTEM MALFUNCTIONS

1. SERVICE BRAKES DO NOT STOP VEHICLE: BRAKE PEDAL NOT FIRM, SPONGY OR EXCESSIVE PEDAL TRAVEL.

Step 1. Check brake master cylinder reservoir. Refer to LO 9-2350-272-12.
Add brake fluid. Refer to LO 9-2350-272-12.
Bleed brake system. Refer to paragraph 3-101.

Step 2. Check brake hoses, lines and fittings for leaks and damage.
Tighten loose connections.
Replace damaged hoses, lines and fittings. Refer to paragraph 3-105.

Step 3. Check brake assembly for leaks or damage.
Replace leaking or damaged brake assembly. Refer to paragraph 3-99.
Replace defective master cylinder. Refer to paragraph 3-100.

2. SERVICE BRAKES DO NOT STOP VEHICLE, BUT PEDAL IS FIRM.

Step 1. Check brake system by bleeding system to determine if a brake line is blocked or restricted. Refer to paragraph 3-87.
Replace blocked or restricted brake line. Refer to paragraph 3-105.

Step 2. Check brake assembly for sticking or frozen calipers.
Replace defective brake calipers. Refer to paragraph 3-104.

Step 3. Check brake assembly brake pads for glazed or oil soaked brake pads.
Replace brake pads. Refer to paragraph 3-102.

Step 4. Check brake assembly for binding brake caliper sliding surfaces.
Lubricate brake caliper sliding surfaces. Refer to LO 9-2350-272-12.
Replace defective brake assembly. Refer to paragraph 3-99.

3. SERVICE BRAKES DO NOT FULLY RELEASE (DRAGGING BRAKES).

Step 1. Check parking brake adjustment. Refer to paragraph 3-94.
Adjust parking brake. Refer to paragraph 3-94.

Step 2. Check brake assembly for binding
Brake caliper sliding surfaces.
Lubricate brake caliper sliding surfaces. Refer to LO 9-2350-272-12.

Step 3. Check brake assembly for sticking calipers.
Replace defective brake calipers. Refer to paragraph 3-104.

Step 4. Check master cylinder for excessive free pedal travel.
Replace defective master cylinder. Refer to paragraph 3-100.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

4. NOISY OR GRABBING BRAKES.

Step 1. Check brake assembly for scored or damaged disc and sticking calipers.
    Replace defective brake disc. Refer to paragraph 3-103.
    Replace defective brake calipers. Refer to paragraph 3-104.

Step 2. Check brake assembly brake pads for glaze, dirt or grease in brake pads.
    Clean brake pads.
    Replace brake pads. Refer to paragraph 3-102.

5. PARKING BRAKE WILL NOT RELEASE

Step 1. Check parking brake cable for binding.
    Repair parking brake cable.
    Replace defective parking brake cable. Refer to paragraph 3-106.

Step 2. Check brake assembly right hand caliper for binding or damaged parking brake mechanism.
    Replace defective brake caliper. Refer to paragraph 3-104.

6. PARKING BRAKE DOES NOT HOLD VEHICLE.

Step 1. Check parking brake adjustment. Refer to paragraph 3-108.
    Adjust parking brake. Refer to paragraph 3-108.

Step 2. Check brake assembly right hand caliper for binding or damaged parking brake mechanism.
    Replace defective brake caliper. Refer to paragraph 3-104.

Step 3. Check brake assembly for worn or oil soaked brake pads.
    Replace worn or oil soaked brake pads. Refer to paragraph 3-102.

STEERING SYSTEM MALFUNCTIONS.

VEHICLE FAILS TO STEER PROPERLY.

Step 1. Check steering hydraulic fluid tank level. Refer to LO 9-2350-272-12.
    Add fluid. Refer to LO 9-2350-272-12.

Step 2. Check steering hydraulic pump for leaks and damage.
    Replace defective pump. Refer to paragraph 3-111.

Step 3. Check steering system hoses, lines, fitting for damage and leaks.
    Tighten loose lines and mounting hardware.

TROUBLESHOOTING (CONTINUED)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

HEATER/DEFROSTER MALFUNCTIONS

1. HEATER OR DEFROSTER DOES NOT OPERATE; BLOWER OPERATES PROPERLY.

Check heating air valve control for leaks and seized valve.
Repair air valve control.
Replace air valve control.

2. NO HEAT FRONT CAR; HEATER/DEFROSTER BLOWER MOTOR OPERATES PROPERLY.

Check heater air temperature control valve for damage.
Repair air temperature control valve.
Replace air temperature control valve.

3. NO HEAT REAR CAR; HEATER BLOWER MOTOR OPERATES PROPERLY.

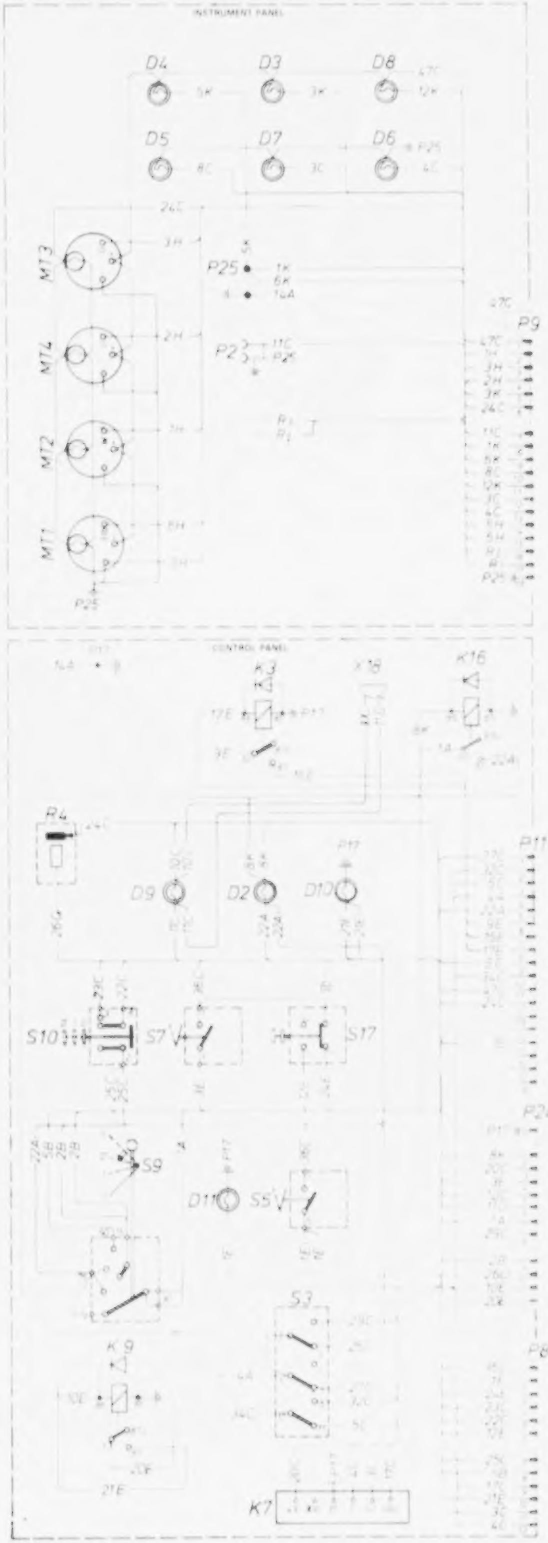
Step 1. Check for loose or damaged heater control cable.
Tighten loose control cable clamps.
Replace damaged control cable.
Step 2. Check heater air temperature control valve for damage.
Repair air temperature control valve.
Replace air temperature control valve.

WINCH MALFUNCTIONS

WINCH DOES NOT OPERATE.

Step 1. Check power cable for continuity.
Repair power cable.
Replace power cable.
Step 2. Check remote control cable for continuity.
Repair remote control cable.
Replace remote control cable.

ELECTRICAL WIRING DIAGRAM-SHEET 1 of 4


INSTRUMENT PANEL
D4
D3
D8
D5
D7
D6
MT3
MT4
MT2
MT1
P25
P2
P9
CONTROL PANEL
K3
K18
K16
R4
P11
D9
D2
D10
S10
S7
S17
P24
S9
D11
S5
S3
K9
P8
K7

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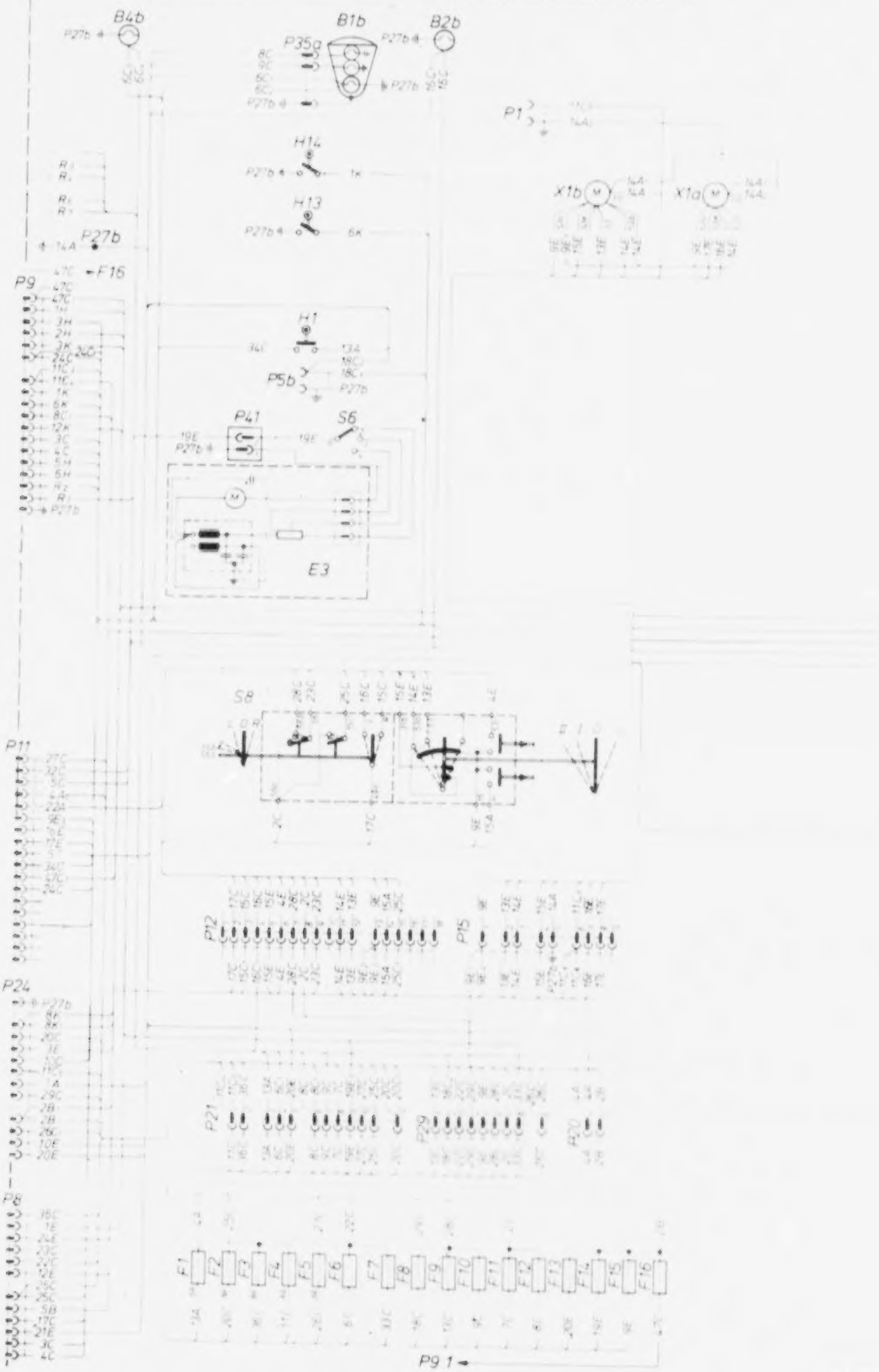
ELECTRICAL WIRING DIAGRAM-SHEET 2 of 4


B4b
B1b
B2b
P35a
P27b
P1
H14
H13
X1b
X1a
P27b
F16
P9
H1
P5b
P41
S6
E3
S8
P11
P12
P15
P24
P21
P29
P20
P8
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
F13
F14
F15
F16
P9 1

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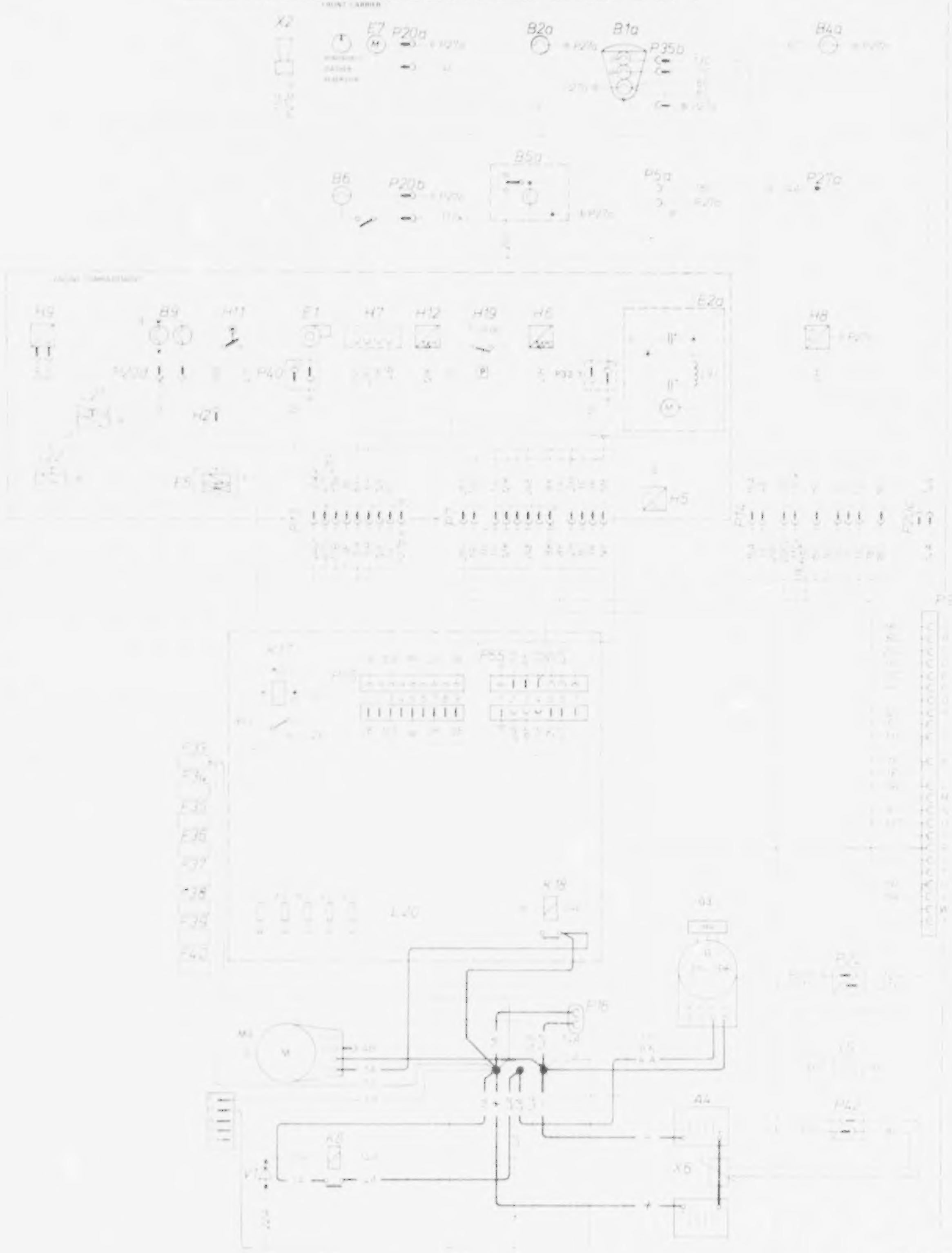
ELECTRICAL WIRING DIAGRAM-SHEET 3 of 4


FRONT CARRIER
X2
E7
P20a
B2a
B1a
P35b
B4a
B6
P20b
B5a
P5a
P27c
ENGINE COMPARTMENT
H9
B9
H11
E1
H7
H12
H19
H6
E2a
H8
P40
H21
E5
H5
K17
P55
K18
M4
P16
G3
A4
X6
K8
V1
P42

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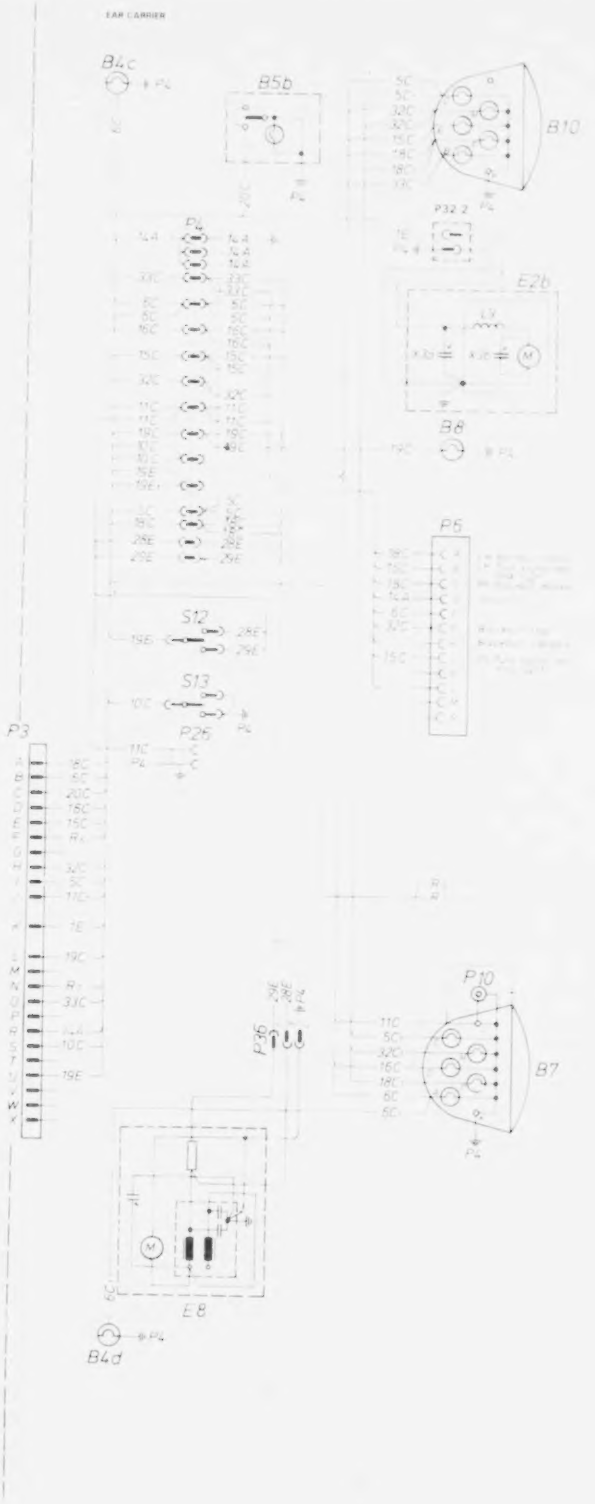
ELECTRICAL WIRING DIAGRAM-SHEET 4 of 4


B4c
B5b
B10
P4
P32 2
E2b
B8
P5
S12
S13
P26
P3
P36
P10
B7
E8
B4d

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WIRING DIAGRAM
ELECTRICAL COMPONENT LEGEND

KEY	DESCRIPTION
A4	Battery, 12V 105AH
B1 a	Headlamp, w parking light Bulb 24V, 55/50W Bulb 24 V, 4W
B1 b	Headlamp, w parking light Bulb 24V, 55/50W Bulb 24 V, 4W
B2	Direction indicator lamp Bulb 24V, 18W
B2 b	Direction indicator lamp Bulb 24V, 18W
B4 a	Side marker light Bulb 24V, 5W
B4 b	Side marker light Bulb 24V, 5W
B5 a	Cabin lamp Bulb 24V, 10W
B5 b	Cabin lamp Bulb 24V, 10W
B6	Map reading lamp Bulb 24V, 5W
B7	Combination rear lamp and socket connector Bulb 24V, 21W Bulb 24V, 10W Bulb 24V, 3W
B8	Back-up lamp Bulb 24V, 21W
B9	Gear lever lamp Bulb 24V, 2W
B10	Combination rear lamp Bulb 24V, 21W Bulb 24V, 10W Bulb 24V, 3W

KEY	DESCRIPTION
D2	Indicator light, battery charging Bulb 24V, 2W
D3	Indicator light, engine oil pressure Bulb, 24V, 2W
D4	Indicator light, brake circuit, parking brake Bulb 24V, 2W
D5	Indicator light, high beam Bulb 24V, 2W
D6	Indicator light, direction indicator, front car Bulb 24V, 2W
D7	Indicator light, direction indicator, rear car Bulb 24V, 2W
D8	Indicator light, automatic transmission temperature Bulb 24V, 2W
D9	Indicator light, intercom Bulb 24V, 2W
D10	Indicator light, battery heater Bulb 24V, 2W
D11	Indicator light, bilge pumps Bulb 24V, 2W
E1	Circulating pump
E2 a	Bilge pump
E2 b	Bilge pump
E3	Space heater, front car Motor 24V
E5	Solenoid valve, 1st gear
E7	Windshield washer pump, Motor 24V
E8	Space heater, rear car Motor 24V

WIRING DIAGRAM
ELECTRICAL COMPONENT LEGEND — Continued

KEY	DESCRIPTION
F1	Fuse 8A, Brake light
F2	Fuse 8A, Direction indicator Cabin lighting
F3	Fuse 8A Circulating pump Bilge pumps
F4	Fuse 8A, Intercom Map reading lamp All socket power outlets 24V Gear lever illumination
F5	Fuse 8A, Back-up lamp Instrument lighting
F6	Fuse 8A, Parking lights Side marker lights Rear lamp, LH
F7	Fuse 8A, Rear lamp RH
F8	Fuse 8A, Blackout lamps Trailer receptacle
F9	Fuse 8A, Low beam, RH
F10	Fuse 8A, Low beam, LH
F11	Fuse 8A, High beam, RH
F12	Fuse 8A, High beam, LH
F13	Fuse 8A, Battery heater
F14	Fuse 8A, Fan motors Space heaters

KEY	DESCRIPTION
F15	Fuse 8A, Windshield wipers Windshield washer pump and horn
F16	Fuse 8A, Instrument Indicator lights 1st gear solenoid valve
F33	Fuse 8A, Glow plugs
G3	Alternator 28V 55A
H1	Brake light contact
H2	Switch connection, 1st gear solenoid valve
H5	Pressure switch, engine oil
H6	Engine coolant temperature sensor
H7	Switch contact, back-up lamp and start interlock
H8	Fuel level gauge transmitter
H9	Speedometer pulse generator
H11	Contact, 1st gear
H12	Transmission temperature sensor
H13	Contact, brake circuits
H14	Contact, parking brake
H19	Pressure switch, turbo
K3	Relay 24V, windshield wiper
K7	Turn signal
K8	Main switch relay
K9	Relay 24V, battery heater

WIRING DIAGRAM
ELECTRICAL COMPONENT LEGEND – Continued

KEY	DESCRIPTION
K16	Relay 24V, hold on charging system
K17	Relay, turbo
K18	Relay, glow plug
L20	Glow plug
L21	Engine shut off solenoid
L22	Turbo solenoid
M3	Starting motor 24V
MT1	Speedometer, odometer Bulb 24V, 4W
MT2	Tachometer
MT3	Fuel gage Bulb 24V, 2W
MT4	Coolant temperature indicator Bulb 24V, 2W
P1	Connector, w/cover Front car, front panel
P2	Connector, w/cover Instrument panel
P3	Connector, 23-pole
P4	Terminal board, Rear car
P5 a	Connector, w/cover Blackout lamp, outside front
P5 b	Connector, w/cover Blackout lamp, outside front
P6	Connector, 12-pole Rear car
P7	Connector, 12-pole Engine

KEY	DESCRIPTION
P8	Connector, 12-pole Control panel
P9	Connector, 12-pole Instrument panel
P10	Connector, Part of combination rear lamp
P11	Connector, 9-pole Control panel
P12	Connector, 18-pole Direction indicator level
P13	Connector, 9-pole Engine
P14	Connector, 9-pole RH side
P15	Connector, 9-pole Windshield wiper
P16	Socket connector, 2-pole Slave receptacle
P17	Terminal board Control panel
P20 a	Plug, female, 2-pole
P20 b	Plug, female, 2-pole
P20 c	Plug, female, 2-pole
P20 d	Plug, female, 2-pole
P21	Connector, 12-pole Fuse box Instrument panel
P22	Connector, 2-pole For X5
P24	Connector, 12-pole Control panel

WIRING DIAGRAM
ELECTRICAL COMPONENT LEGEND — Continued

KEY	DESCRIPTION
P25	Terminal board Instrument panel
P26	Connector, w/cover Switch panel, rear car
P27 a	Terminal board, 6-pole Negative terminal, left and right side
P27 b	Terminal board, 6-pole Negative terminal, left and right side
P29	Connector, 9-pole Fuse box Instrument panel
P32:1	Plug, male, 2-pole Bilge pump, front carrier
P32:2	Plug, female, 2-pole Bilge pump, rear carrier
P35 a	Plug, female, 3-pole Headlamp
P35 b	Plug, female, 3-pole Headlamp
P36	Connector, 3-pole Heater, rear car
P40	Connector Circulating pump
P41	Connector, 2-pole heater, front car
P42	Connector, 2-pole Temperature sensor Battery acid
P55	Connector
P56	Connector
R4	Variable resistor, instrument lighting

KEY	DESCRIPTION
S3	Switch, light Control panel
S5	Switch, bilge pumps Control panel
S6	Switch, space heater, front car
S7	Switch, circulating pump Control panel
S8	Switch, direction indicators, windshield wiper/washer, headlights – high/low beam, horn, light signalling
S9	Ignition lock, Control panel
S10	Switch, light Control panel
S12	Switch, space heater, rear car Switch panel
S13	Switch, intercom Switch panel
S17	Switch, glow plug
V1	Diode, main switch relay
X1 a	Windshield wiper
X1 b	Windshield wiper
X2	Horn
X5	Battery heater
X6	Battery acid temperature sensor
X18	Intercom buzzer

CHAPTER 3

MAINTENANCE INSTRUCTIONS

SECTION I. GENERAL INFORMATION

3-1. GENERAL MAINTENANCE INFORMATION.

a. Detailed Maintenance Instructions.

Specific component removing, replacing and testing tasks are provided in Chapter 3. Use LO 9-2350-272-12 for proper grades and amount of fluids to be added after completing the task.

b. Cleanliness.

It is important to keep mechanical parts as clean as possible when performing maintenance. Keep work area clean and dry. Clean tools as you use them. Keep parts on clean rags. Cover open lines and component openings.

WARNING

Cleaning solvent, federal specification P-D-680, TYPE II is flammable and gives off harmful vapors. Use solvent only in a well-ventilated area. Avoid prolonged breathing of solvent vapors. Keep solvent away from flame. Do not use solvent in excessive amounts.

c. Preformed Packing.

Replace all preformed packings removed during maintenance or services. Coat all preformed packing with a light coat of engine oil before installation.

d. Locking Devices.

Always use new cotter pins to replace those removed during services or maintenance. Replace broken or missing cotter pins. Replace broken locking wires.

e. Torquing Procedures.

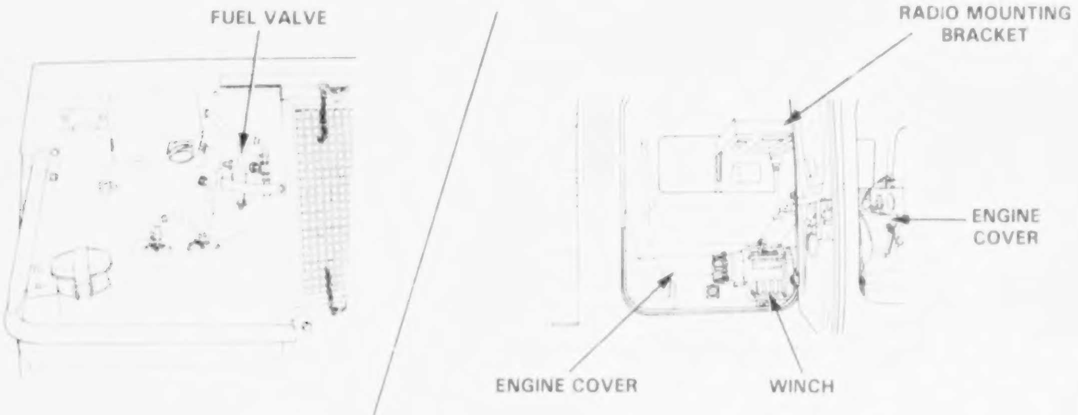
Non-standard torque values are given in the maintenance tasks. Clean thread on bolts and nuts before torquing them. Metric and English standard torque values are shown in Appendix C.

Section II. ENGINE AND RELATED SYSTEMS MAINTENANCE INSTRUCTIONS

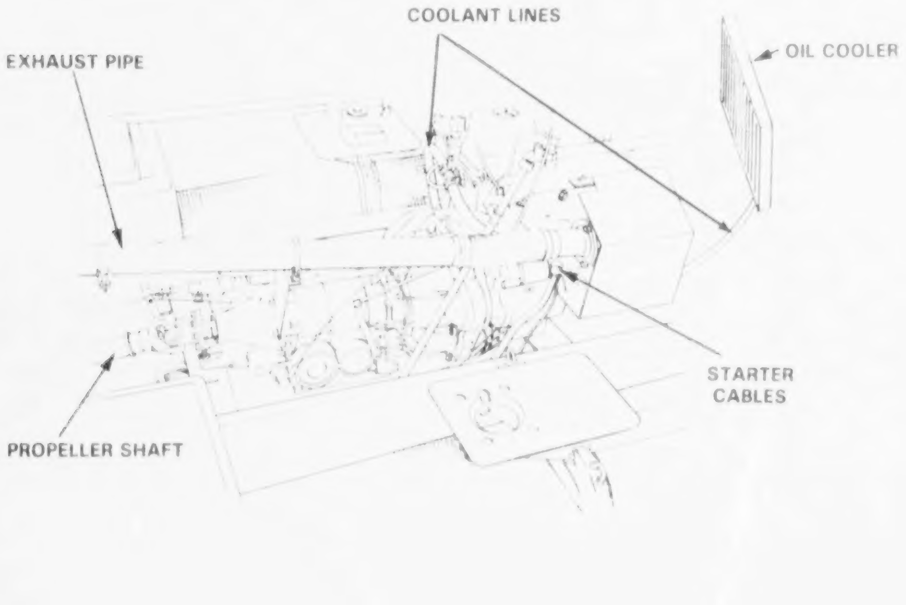
3-2. REMOVE AND REPLACE POWER PACK (ENGINE WITH TRANSMISSION).

a. Remove.

Step 1. Remove drain plug and drain water from engine compartment.
Step 2. Turn off fuel valve at sediment bowl.
Step 3. Remove battery box cover. Disconnect battery ground cable. Replace battery box cover.
Step 4. Drain cooling system. Refer to paragraph 3-23.
Step 5. Remove fire extinguisher and bracket.


FUEL VALVE
RADIO MOUNTING BRACKET
ENGINE COVER
ENGINE COVER
WINCH

Step 6. Remove exhaust pipe. Refer to paragraph 3-24.
Step 7. Disconnect electrical cables from starter. Turn off heater valves (left rear engine compartment).
Step 8. Remove hose clamps and disconnect heater coolant lines.
Step 9. Disconnect propeller shaft with transmission in neutral.


COOLANT LINES
EXHAUST PIPE
OIL COOLER
STARTER CABLES
PROPELLER SHAFT

TA259181

Step 10. Place transfer in neutral. Remove transfer shifting rod by removing lock clip from each end.

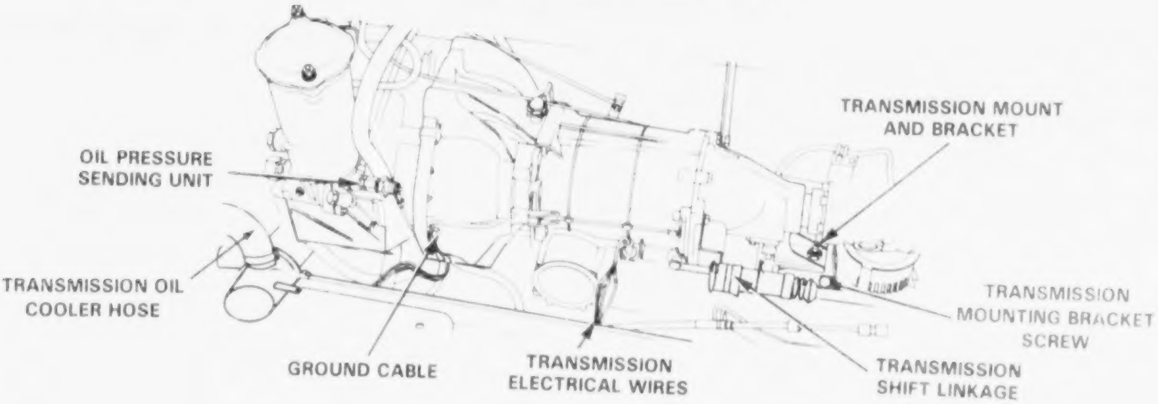
Step 11. Disconnect transmission shift linkage at transmission.

Step 12. Remove nut from rear transmission mount. Remove screw from under transmission mounting bracket. Remove nut from left and right engine mount.

Step 13. Unplug electrical wires from transmission.

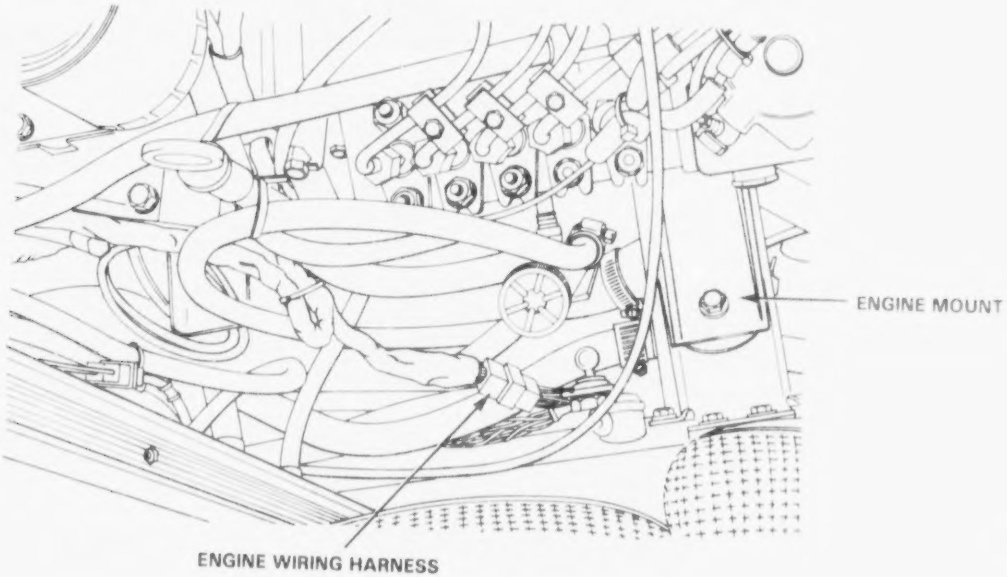
Step 14. Disconnect ground cable from transmission flange.

Step 15. Unplug electrical wire from oil pressure sending unit.


TRANSMISSION MOUNT AND BRACKET
OIL PRESSURE SENDING UNIT
TRANSMISSION OIL COOLER HOSE
TRANSMISSION MOUNTING BRACKET SCREW
GROUND CABLE
TRANSMISSION ELECTRICAL WIRES
TRANSMISSION SHIFT LINKAGE

Step 16. Disconnect left front transmission oil cooler hose.

Step 17. Unplug engine wiring harness from chassis wiring harness.

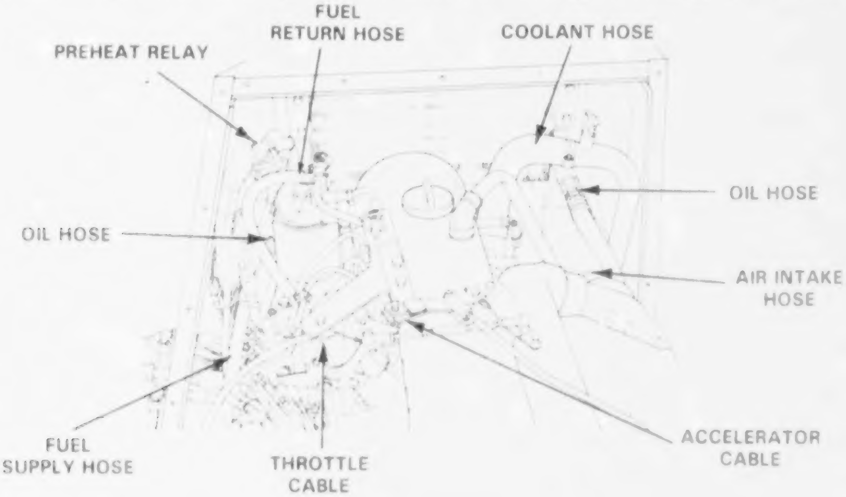

ENGINE MOUNT
ENGINE WIRING HARNESS

TA259182

NOTE

If end of throttle cable has a metal stop, cut it off and do not replace.

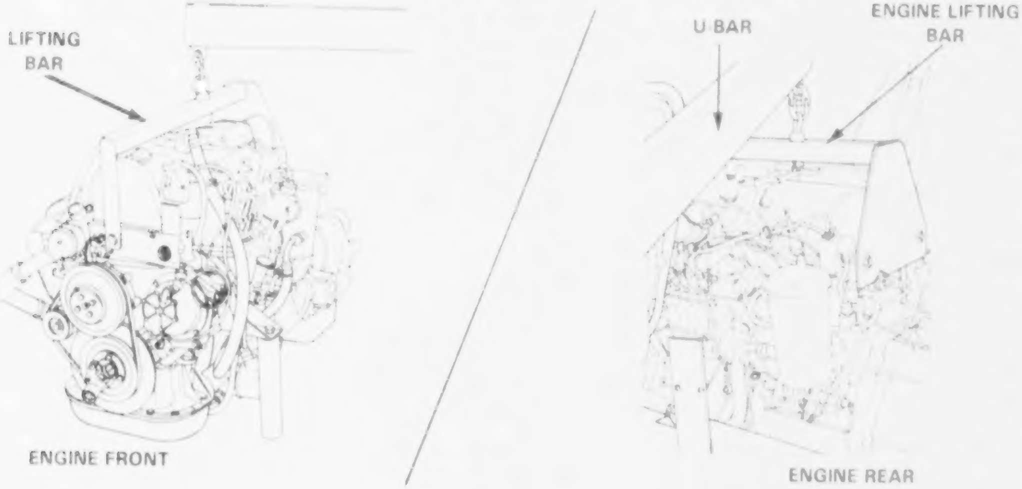
Step 18. Disconnect accelerator and throttle cables. Move cables out of the way.
Step 19. Remove fuel return hose from fuel filter.
Step 20. Disconnect fuel supply hose from fuel pump.
Step 21. Disconnect electric cable and wire from terminal nearest drivers seat on preheat relay.
Step 22. Remove cover from right front side of engine compartment.
Step 23. Disconnect air intake hose from turbocharger.
Step 24. Remove two coolant hoses.
Step 25. Disconnect and cap two oil hoses and fittings from engine oil cooler.


FUEL RETURN HOSE
COOLANT HOSE
PREHEAT RELAY
OIL HOSE
OIL HOSE
AIR INTAKE HOSE
FUEL SUPPLY HOSE
THROTTLE CABLE
ACCELERATOR CABLE

CAUTION

Complete Step 29 before lifting power pack. Damage to equipment may occur.

Step 26. Remove engine front lifting bracket.
Step 27. Attach lifting bar to engine. Refer to Table 2-1, item 4.

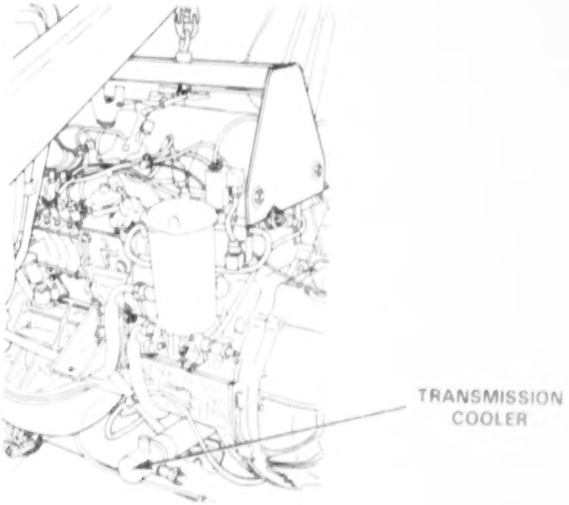

LIFTING BAR
U-BAR
ENGINE LIFTING BAR
ENGINE FRONT
ENGINE REAR

TA259183

Step 28. Attach U-bar to lifting device. Refer to table 2-1, item 3.

Step 29. Put U-bar through left rear door and attach to lifting bar.

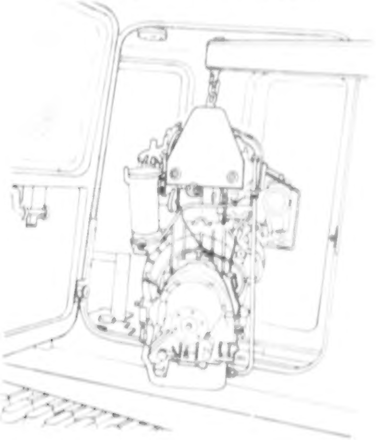
Step 30. While lifting check that engine-to-hydraulic pump propeller shaft slides apart. Lift power pack six inches. Disconnect electric wire from transmission cooler temperature sensor.



CAUTION

Be careful when removing engine through door. Tolerance between the engine and doorway is very close.

Step 31. Remove power pack through left rear door.



b. Replace

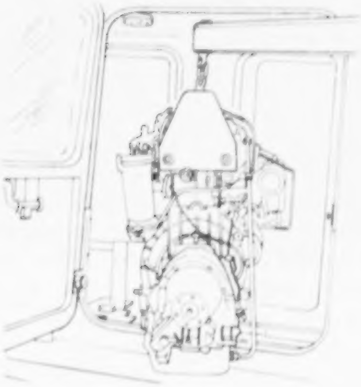
CAUTION

Be careful when replacing engine through door. Tolerance between the engine and doorway is very close.

Step 1. Connect lifting bar and U-bar fixture to engine.

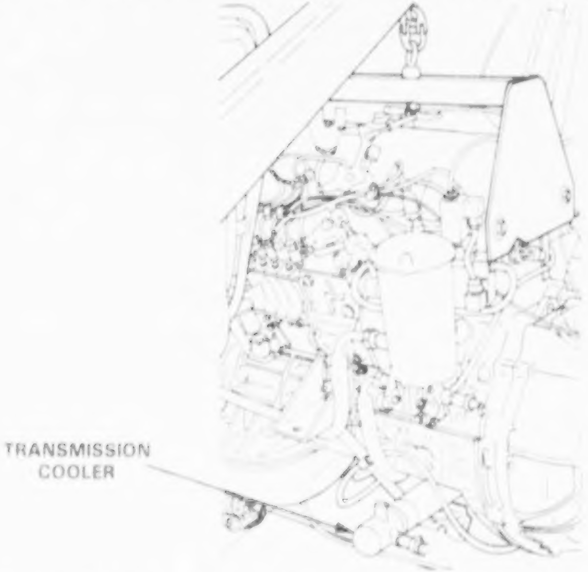
Step 2. Replace power pack through left rear door.

TA259184



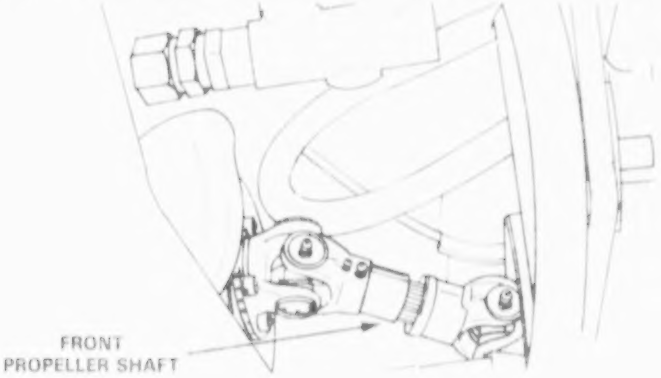
Step 3. Lower power pack into engine compartment until power pack is six inches above engine mounts.

Step 4. Connect electric wire to transmission cooler temperature sensor.


TRANSMISSION
COOLER

Step 5. Hold front propeller shaft in position. Align the splines and connect two ends of propeller shaft as power pack is lowered.

Step 6. Lower power pack onto the engine and transmission mounts.

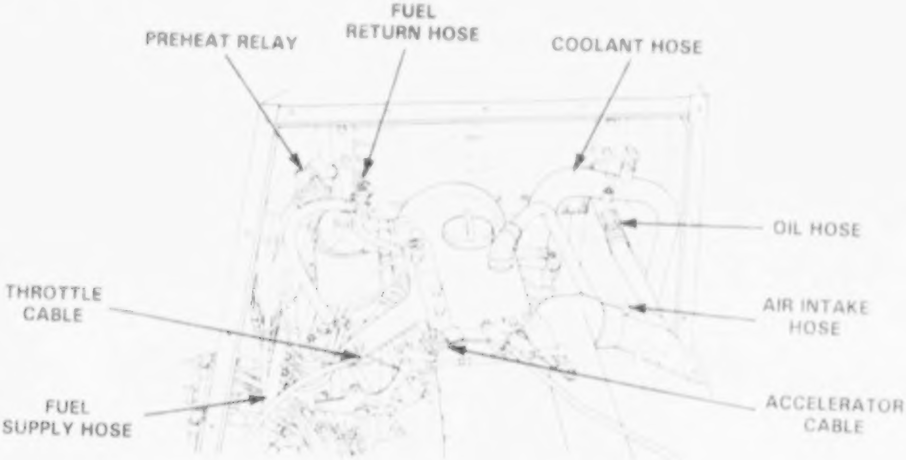

FRONT
PROPELLER SHAFT

TA259185

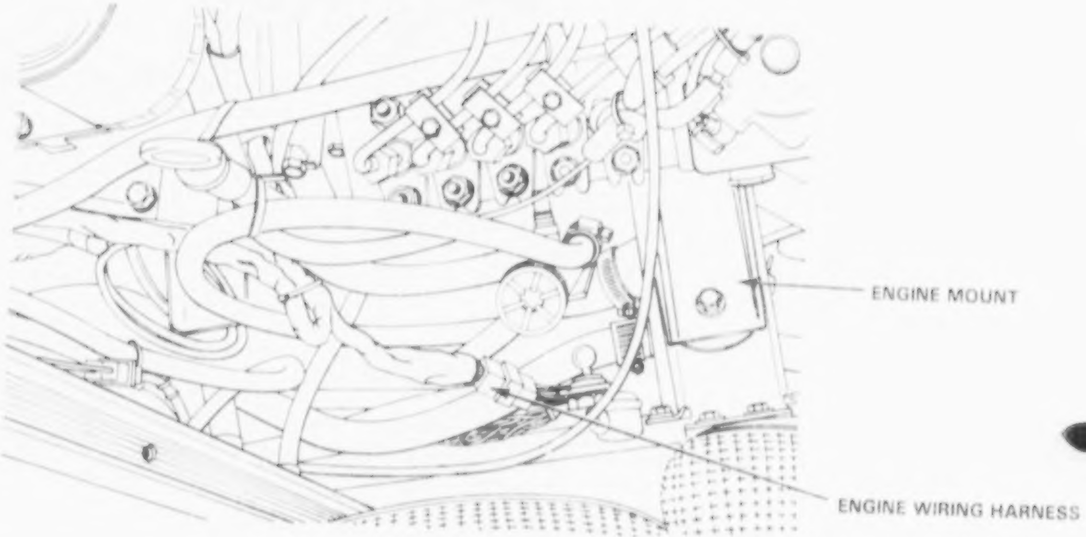
WARNING

Oil cooler cooling fins are extremely sharp. Be very careful when handling cooler to avoid cuts.

Step 7. Remove fixture and lifting bar. Replace engine front lifting bracket.
Step 8. Remove hose caps and connect two oil hoses to oil cooler.
Step 9. Connect two coolant hoses to engine. Tighten hose clamps.
Step 10. Connect air intake hose to turbocharger. Tighten clamp.
Step 11. Connect electrical cable and wire to preheat relay.
Step 12. Connect fuel supply hose to fuel pump.
Step 13. Install fuel return hose on fuel filter.
Step 14. Connect accelerator and throttle cables.

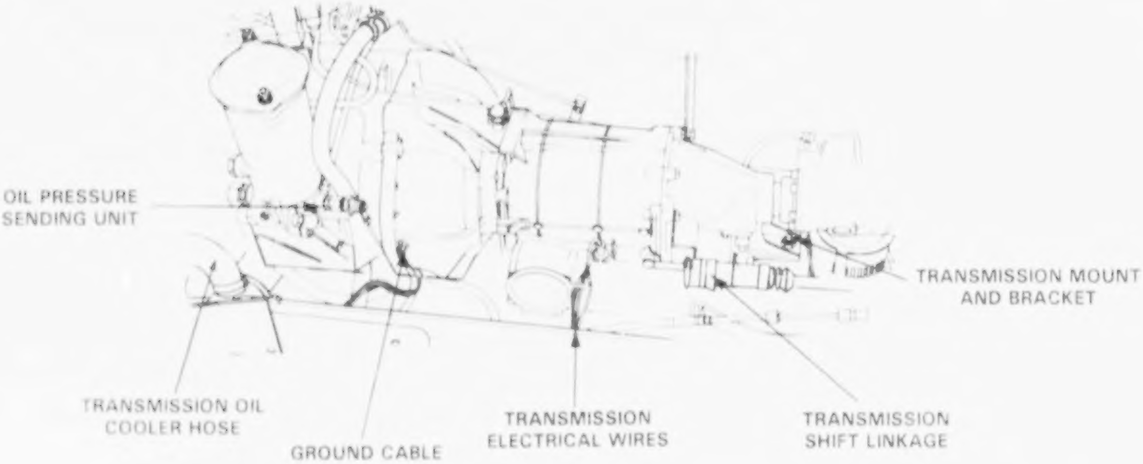

PREHEAT RELAY
FUEL RETURN HOSE
COOLANT HOSE
OIL HOSE
THROTTLE CABLE
AIR INTAKE HOSE
FUEL SUPPLY HOSE
ACCELERATOR CABLE

Step 15. Put on and tighten engine mount nuts and transmission nut.

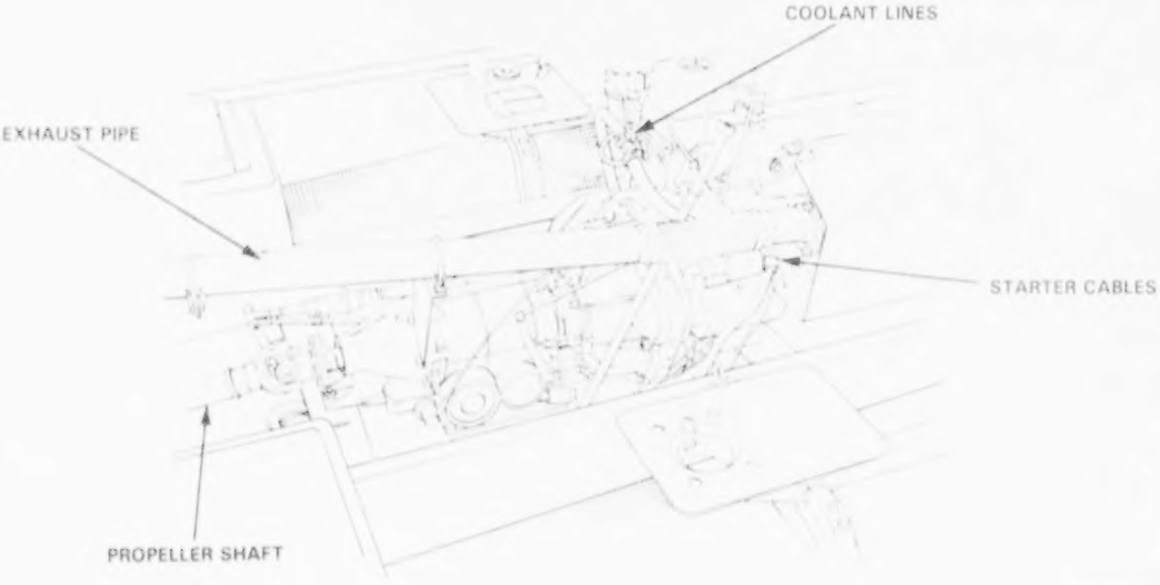

ENGINE MOUNT
ENGINE WIRING HARNESS

TA259186

Step 16. Connect engine wiring harness to chassis wiring harness.
Step 17. Connect coolant hose to transmission oil cooler.
Step 18. Connect electrical wire to oil pressure sending unit.
Step 19. Connect ground cable to transmission flange.
Step 20. Plug electrical wires into left side of transmission.
Step 21. Put transmission mounting bracket in position. Put in and tighten screw.
Step 22. Connect transmission shift linkage to transmission.
Step 23. Install transfer shifting rod. Refer to paragraph 3-34.

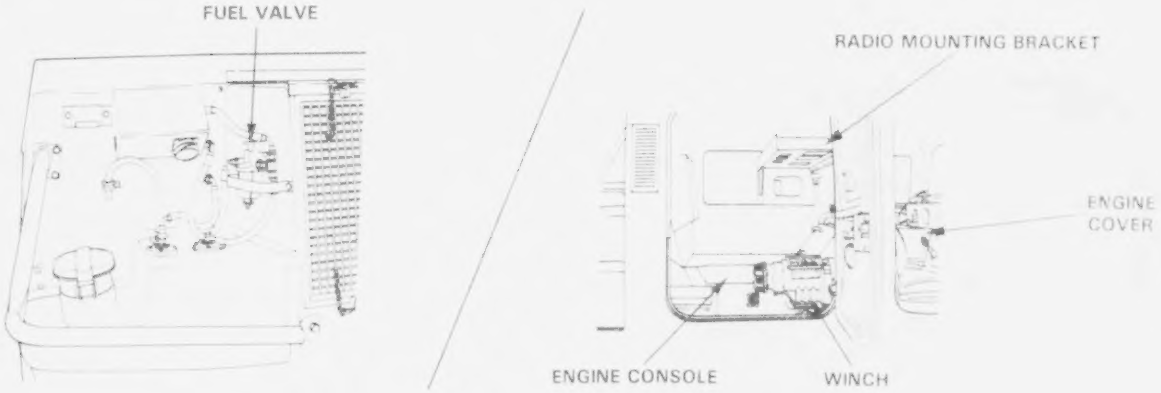

OIL PRESSURE SENDING UNIT
TRANSMISSION MOUNT AND BRACKET
TRANSMISSION OIL COOLER HOSE
GROUND CABLE
TRANSMISSION ELECTRICAL WIRES
TRANSMISSION SHIFT LINKAGE

Step 24. Connect propeller shaft to transmission. Torque nuts to 37 lb. ft. (50 Nm).
Step 25. Connect coolant line to rear of engine. Tighten clamps.
Step 26. Connect electrical cables to starter. Check and insure all connections have been made to power pack.
Step 27. Install exhaust pipe. Refer to paragraph 3-24.


COOLANT LINES
EXHAUST PIPE
STARTER CABLES
PROPELLER SHAFT

TA259187

Step 28. Connect battery ground cable.
Step 29. Install radio mounting bracket.
Step 30. Replace winch in stowage bracket.
Step 31. Turn on fuel valve.
Step 32. Fill and bleed coolant system. Refer to paragraph 3-23.
Step 33. Bleed fuel system. Refer to paragraph 3-9.
Step 34. Check and refill engine and transmission oil if necessary. Refer to LO 9-2350-272-12.
Step 35. Start engine and check operation and adjustment of accelerator cable and engine stop. Refer to paragraph 3-13.
Step 36. Check and adjust hand throttle. Refer to paragraph 3-14.
Step 37. Install cover on right front side of engine compartment.



3-3. REMOVE AND REPLACE ENGINE MOUNTS

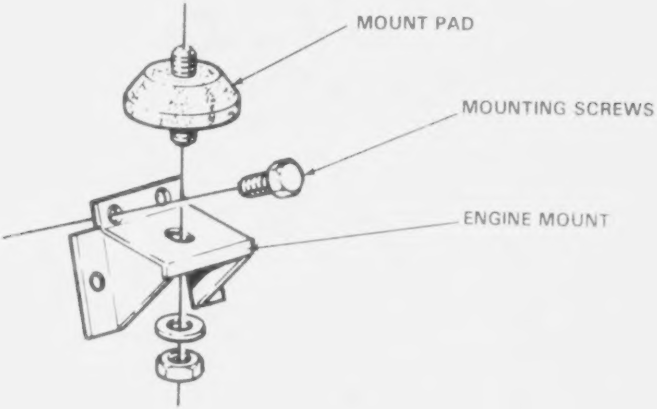
a. Remove.

Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Remove engine mount mounting screws.
Step 3. Remove engine mount.
Step 4. Remove nut and washer from mount pad. Remove pad.

TA259188

b. Replace.

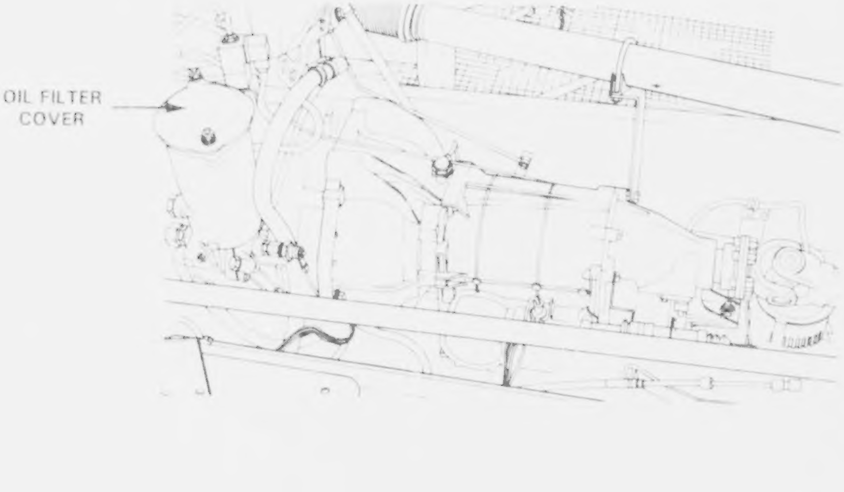
Step 1. Put pad on engine mount. Put on nut and washer. Tighten nut.
Step 2. Put engine mount in place.
Step 3. Put in mounting screws. Tighten screws.
Step 4. Replace power pack. Refer to paragraph 3-2.


MOUNT PAD
MOUNTING SCREWS
ENGINE MOUNT

3-4. REMOVE AND REPLACE ENGINE OIL FILTER

a. Remove.

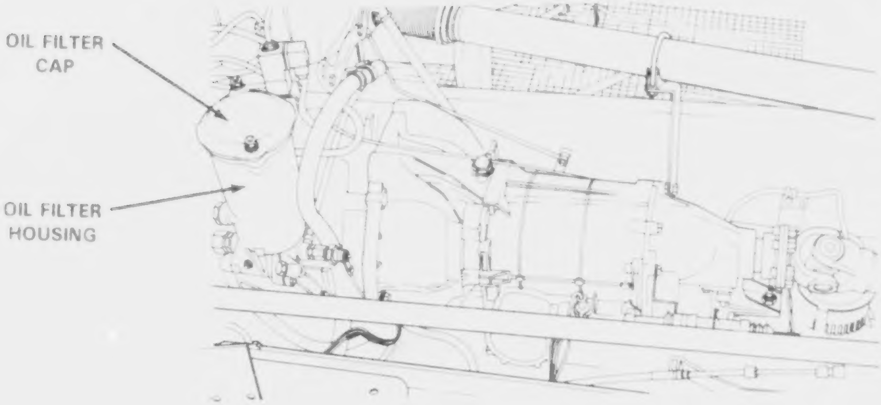
Step 1. Remove engine hood. Raise and support engine cover 4 inches.
Step 2. Remove two engine oil filter cover nuts. Remove cover.
Step 3. Pull oil filter up 2 in. (50 mm). Let oil drain back into oil pan. Remove filter.


OIL FILTER COVER

TA259189

b. Replace.

Step 1. Put oil filter in housing.
Step 2. Fill housing ¾ full with oil. Refer to LO 9-2350-272-12 for proper grade of oil.
Step 3. Put cap and preformed packing in place.
Step 4. Put on and torque nuts to 15 to 18 lb. ft. (20 to 25 Nm)
Step 5. Check engine oil.
Step 6. Operate engine at idle. Check for leaks.
Step 7. Stop engine. Check oil. Add oil as necessary. Refer to LO 9-2350-272-12.
Step 8. Remove supports and lower engine cover. Fasten cover.
Step 9. Replace hood.



TA259190

3-5. REMOVE AND REPLACE V-BELTS.

a. Remove Alternator V-Belts.

Step 1. Remove engine hood.
Step 2. Remove engine right side access cover.
Step 3. Remove air duct from turbocharger.
Step 4. Remove top nut from alternator adjusting rod assembly.
Step 5. Loosen bottom nut on adjusting rod assembly.
Step 6. Lift alternator off adjusting rod assembly.
Step 7. Remove four screws from engine end of hydraulic pump propeller shaft.
Step 8. Slide propeller shaft towards the pump. Remove V-belts.

b. Replace Alternator V-Belts.

NOTE

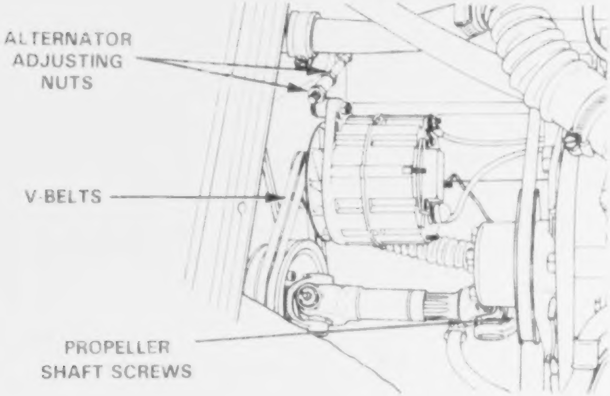
Replace V-belts as a set when installing new belts.

Step 1. Slide V-belts over both pulleys.
Step 2. Align propeller shaft with engine damper pulley.
Step 3. Put in and tighten four propeller shaft mounting screws.
Step 4. Put alternator in place.
Step 5. Tighten bottom nut on adjusting rod assembly.
Step 6. Put nut on adjusting rod assembly. Tighten nut.

NOTE

Alternator V-belts must have 1/4 in. (5 mm) deflection.

Step 7. Place a straight edge across top of both pulleys. Push down on V-belt with a ruler half way between pulleys.
Step 8. Measure V-belts deflection.
Step 9. Adjust alternator adjusting rod assembly if necessary. Recheck deflections.
Step 10. Repeat steps 8 and 9 until deflection is correct.
Step 11. Replace engine right side access cover.
Step 12. Replace engine hood.



TA259191

c. Remove Radiator Fan V-Belt.

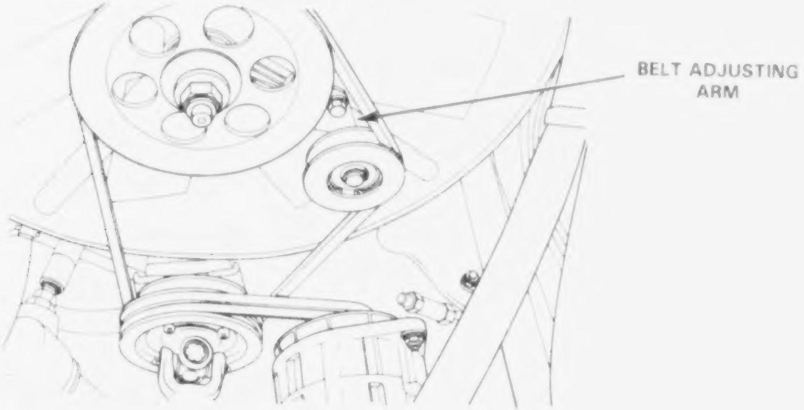
Step 1. Remove alternator V-belts. Refer to paragraph 3-5.
Step 2. Loosen two belt adjusting arm screws.
Step 3. Push down on adjusting arm. Remove V-belt from pulleys.

d. Replace Radiator Fan V-Belt.

Step 1. Slide V-belt over pulleys.
Step 2. Push up on adjusting arm and tighten two arm screws.
Step 3. Replace alternator V-belts. Refer to paragraph 3-5. Check deflection of all belts.

NOTE

Fan V-belt must have 3/8 in. (10 mm) deflection.



e. Remove Water Pump V-Belt.

Step 1. Remove engine hood.
Step 2. Remove engine right side access cover.
Step 3. Remove four screws on engine end of hydraulic pump propeller shaft. Slide back shaft.
Step 4. Loosen two water pump adjusting arm screws.
Step 5. Push down on arm. Remove V-belt.

f. Replace Water Pump V-Belt.

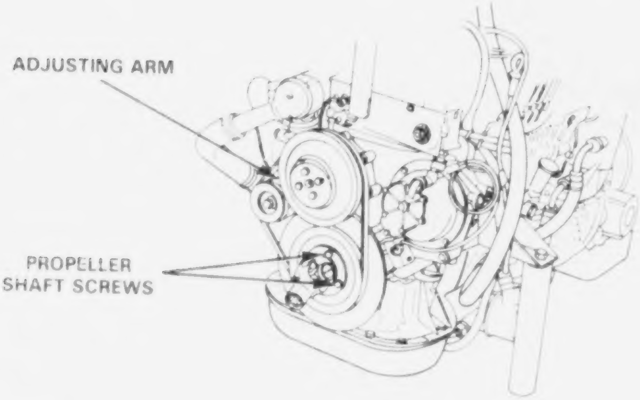
Step 1. Place V-belt over pulleys.
Step 2. Align propeller shaft with damper pulley.
Step 3. Put in and tighten four propeller shaft mounting screws.
Step 4. Tighten two water pump adjusting arm screws.
Step 5. Place a straight edge along side the damper and cam shaft pulley.

NOTE

Water pump V-belt must have 3/8 in. (10 mm) deflection.

TA259192

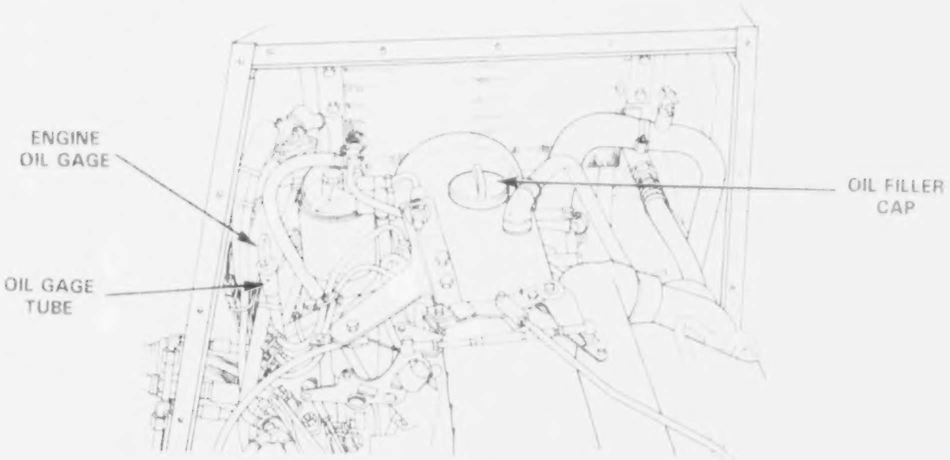
Step 6. Push in at the center of V-belt with a ruler.
Step 7. Measure V-belt deflection.
Step 8. Adjust water pump adjusting arm if necessary. Recheck deflection.
Step 9. Repeat steps 7 and 8 until deflection is correct.
Step 10. Replace engine right side access cover.
Step 11. Replace engine hood.


ADJUSTING ARM
PROPELLER SHAFT SCREWS

3-6. DRAIN AND REFILL ENGINE OIL.

a. Drain.

Step 1. Remove engine hood.
Step 2. Remove dipstick.
Step 3. Using the syringe set. Refer to Table 2-1, item 1. Insert the tube of the syringe in oil dipstick tube. Push it all the way into crankcase.
Step 4. Withdraw all the oil from the engine.


ENGINE OIL GAGE
OIL GAGE TUBE
OIL FILLER CAP

TA259193

b. Refill.

Step 1. Remove engine oil filler cap.

CAUTION

Do not overfill with engine oil. Damage to engine could result.

Step 2. Pour engine oil in oil filler opening. Refer to LO 9-2350-272-12.
Step 3. Put oil filler cap and dipstick in place.
Step 4. Replace engine hood.

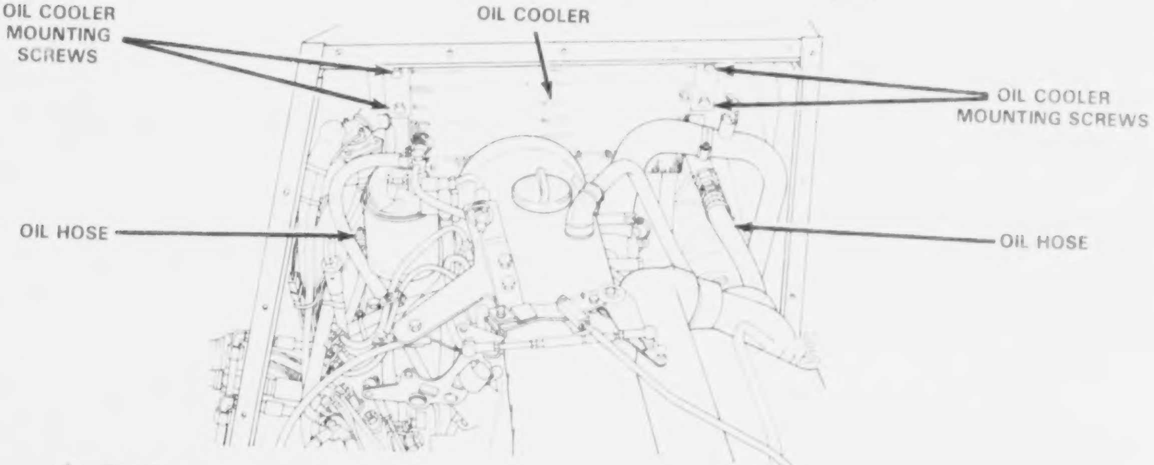
3-7. REMOVE AND REPLACE ENGINE OIL COOLER.

a. Remove.

WARNING

Oil cooler cooling fins are extremely sharp. Be very careful when handling cooler to avoid cuts.

Step 1. Remove engine hood.
Step 2. Remove right side access cover.
Step 3. Open petcock. Drain oil cooler close petcock.
Step 4. Disconnect and plug oil hoses from oil cooler.
Step 5. Remove oil cooler mounting screws. Remove oil cooler.



b. Replace.

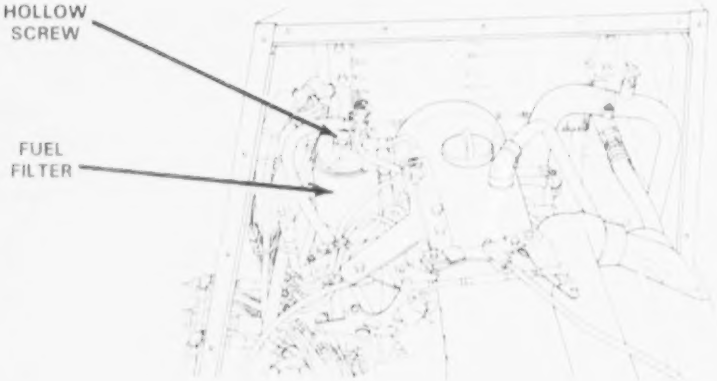
Step 1. Put oil cooler in place.
Step 2. Put in and tighten mounting screws.
Step 3. Take out plugs and connect oil hoses to oil cooler. Tighten line nuts.
Step 4. Check oil level, add oil if required. Refer to LO 9-2350-272-12.
Step 5. Operate engine and check for leaks.
Step 6. Replace side access cover.
Step 7. Replace engine hood.

TA259194

3-8. REMOVE AND REPLACE FUEL FILTER.

a. Remove.

Step 1. Remove engine hood.
Step 2. Remove hollow screw. Remove fuel filter.
Step 3. Remove preformed packing from hollow screw.



b. Replace.

Step 1. Put new preformed packing on hollow screws.
Step 2. Put filter in place.
Step 3. Put in and tighten hollow screw.
Step 4. Bleed fuel system. Refer to paragraph 3-9.
Step 5. Operate engine and check for leaks.
Step 6. Replace engine hood.

TA259195

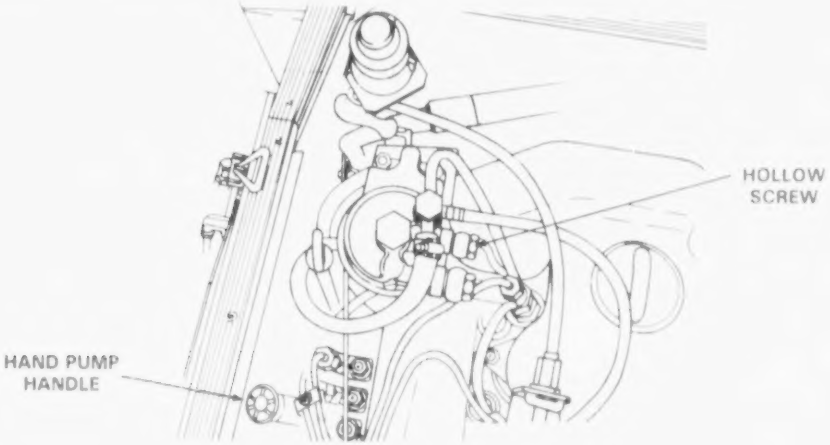
3-9. BLEED FUEL SYSTEM.

Step 1. Loosen hollow screw.
Step 2. Loosen pump handle.

NOTE

During bleeding maintain pressure on hand pump until the last step is completed. This will prevent air from leaking back into the system.

Step 3. Operate pump handle up and down until fuel flows from hollow screw connection with no air bubbles.
Step 4. Tighten hollow screw.
Step 5. Tighten hand pump handle.



3-10. REMOVE AND REPLACE FUEL LEVEL TRANSMITTER.

a. Remove.

Step 1. Tag and remove leads from fuel level transmitter.
Step 2. Remove transmitter mounting screws.
Step 3. Remove transmitter, retainer and gasket.

b. Replace.

Step 1. Put transmitter with retainer and gasket in place.
Step 2. Screw in and tighten transmitter mounting screws.
Step 3. Using location tags, connect leads to transmitter.
Step 4. Check operation.

TA259196

3-11. REMOVE AND REPLACE FUEL TANKS.

a. Remove.

NOTE

Steps 1 and 2 apply to the left tank. Step 3 applies to right fuel tank. Steps 4 and 5 apply to both fuel tanks.

Step 1. Tag and disconnect electrical leads from fuel transmitter.
Step 2. Disconnect two fuel lines from fuel tank.
Step 3. Disconnect fuel lines from fuel tank.
Step 4. Remove fuel tank retaining straps mounting nuts inside of muffler compartment.
Step 5. Remove muffler compartment grille.
Step 6. Remove fuel tank guard.
Step 7. Remove fuel tank.

b. Replace.

Step 1. Put fuel tank in place.

NOTE

Rubber molding on fuel tank retaining straps must be between the strap and fuel tank. This will prevent the strap from rubbing against tank.

Step 2. Put fuel tank retaining straps with rubber molding in place.
Step 3. Put on and tighten nuts.

NOTE

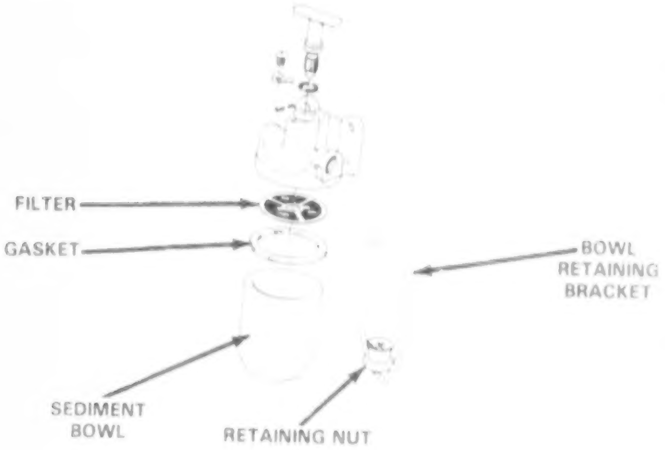
Step 4 applies to right fuel tank. Steps 5 and 6 apply to left fuel tank. Steps 7 and 8 apply to both fuel tanks.

Step 4. Connect fuel lines to fuel tank.
Step 5. Connect two fuel lines to fuel tank.
Step 6. Replace fuel tank guard.
Step 7. Replace muffler compartment grille.
Step 8. Using location tags, connect leads to fuel level transmitter.
Step 9. Fill fuel tanks with fuel. Refer to TM 9- 2350-272-10 for proper grade of fuel.
Step 10. Operate engine. Check for leaks.

3-12. REMOVE, CLEAN AND REPLACE FUEL SEDIMENT BOWL.

a. Remove.

Step 1. Remove two screws and sediment bowl guard.
Step 2. Hold sediment bowl and loosen retaining nut.
Step 3. Swing bowl retaining bracket out from under bowl.
Step 4. Remove sediment bowl, gasket and filter.



b. Clean.

Step 1. Clean sediment bowl with a clean rag.
Step 2. Wash filter with cleaning solvent (appendix D, item 41).

c. Replace.

Step 1. Fill sediment bowl with fuel. Refer to TM 9-2350-272-10 for proper grade fuel.
Step 2. Put filter gasket and sediment bowl in place.
Step 3. Swing bowl retaining bracket in place. Tighten retaining nut.
Step 4. Put on sediment bowl guard.

3-13. ADJUST ACCELERATOR LINKAGE AND ENGINE STOP.

a. Adjust Accelerator Cable.

Step 1. Remove engine hood.
Step 2. Disconnect accelerator linkage rod ball socket from accelerator lever.

NOTE

Accelerator cable must be straight between accelerator lever and accelerator cable housing. The cable must be taut, but not applying pressure on the accelerator lever. Screwing accelerator cable housing end clockwise lengthens the cable. Screwing accelerator cable housing end counter clockwise shortens the cable.

TA259197

Step 3. Pull off accelerator cable retaining clip.
Step 4. Adjust accelerator cable end to obtain correct cable length.
Step 5. Put accelerator cable retaining clip in place.

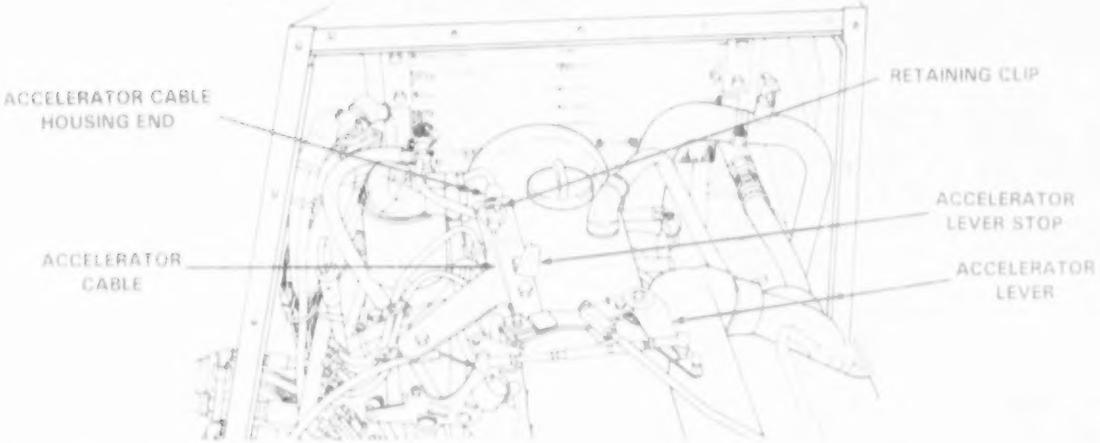
NOTE

When accelerator pedal is fully depressed, accelerator lever should touch accelerator stop with no pressure.

Step 6. Push accelerator pedal down. Check adjustment.

NOTE

If cable adjustment is not correct, repeat steps 3 through 6 above. If cable adjustment operates correctly go to sub-paragraph b below.



b. Adjust Accelerator/Engine Stop.

Step 1. Disconnect accelerator/engine rod from accelerator lever.
Step 2. Hold accelerator/engine stop lever up with no pressure.

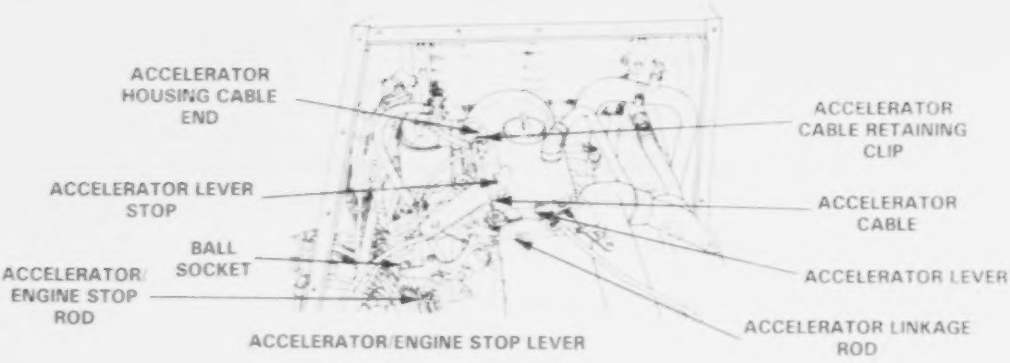
NOTE

To shorten linkage rods, screw ball socket clockwise. To lengthen linkage rods, screw ball socket counter clockwise.

Step 3. Adjust ball socket of accelerator/engine stop rod to fit over ball, free of tension.
Step 4. Connect rod.
Step 5. Adjust accelerator linkage rod to fit over ball of accelerator lever, free of tension.
Step 6. Connect linkage rod.
Step 7. Start engine. Refer to TM 9-2350-272-10.
Step 8. Check operation of accelerator.
Step 9. Stop engine. Refer to TM 9-2350-272-10.
Step 10. Start engine.
Step 11. Push accelerator/engine stop lever toward engine, to check emergency stop.

Step 12. Put engine hood in place.

TA259198


ACCELERATOR HOUSING CABLE END
ACCELERATOR CABLE RETAINING CLIP
ACCELERATOR LEVER STOP
ACCELERATOR CABLE
BALL SOCKET
ACCELERATOR LEVER
ACCELERATOR/ ENGINE STOP ROD
ACCELERATOR/ENGINE STOP LEVER
ACCELERATOR LINKAGE ROD

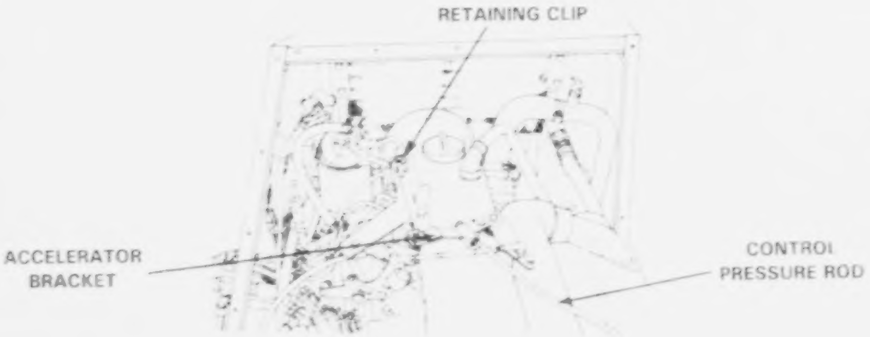
c. Adjust Control Pressure Rod.

Step 1. Remove engine hood.
Step 2. Disconnect control pressure rod from accelerator lever. Loosen lockout on control pressure rod.
Step 3. Remove accelerator bracket from accelerator lever.

NOTE

Regulating lever on injection pump should rest against idle speed stop and free travel rod extended.

Step 4. Carefully push control pressure rod until lever on transmission is against idle speed stop. Hold in this position until adjustment is complete.
Step 5. Hold end of control pressure rod over check bore in accelerator lever, located next to rod connecting stud on accelerator lever.
Step 6. Turn end piece of control pressure rod until hole in end piece alines with check bore. Tighten lock nut.
Step 7. Connect accelerator bracket to accelerator lever.
Step 8. Connect control pressure rod to accelerator lever.
Step 9. Replace engine hood.


RETAINING CLIP
ACCELERATOR BRACKET
CONTROL PRESSURE ROD

TA259199

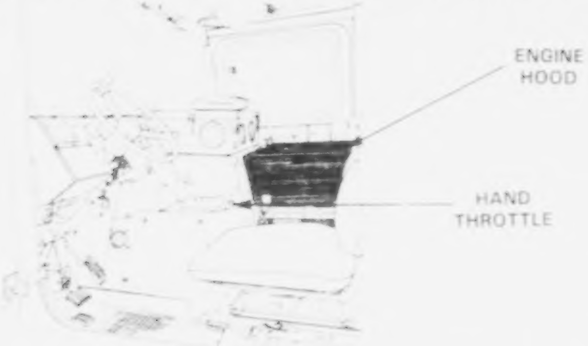
3-14. ADJUST ENGINE HAND THROTTLE.

Step 1. Remove engine hood.
Step 2. Loosen hand throttle cable.
Step 3. Slide cable housing toward engine.

CAUTION

Turbocharger boost pressure begins to kick in at 1100 RPM. Do not adjust hand throttle to more than 1000 RPM. Damage to engine could result.

Step 4. Start engine. Refer to TM 9-2350-272-10.
Step 5. Turn hand throttle knob clockwise (+) all the way to the stop.

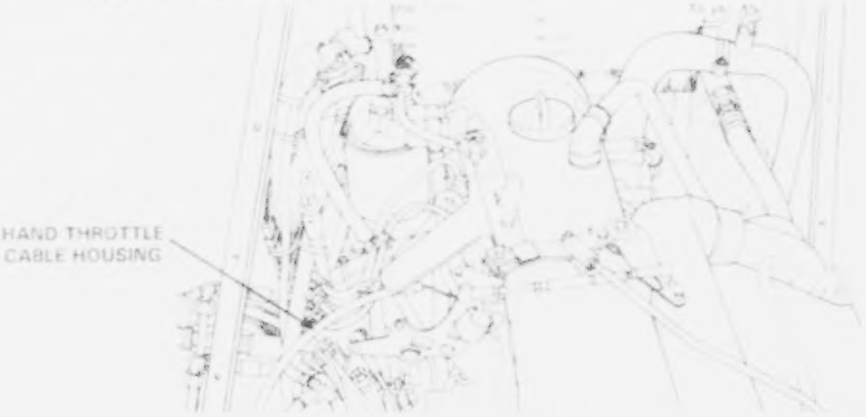


Step 6. Slowly pull hand throttle cable housing outward until 1000 RPM is obtained.
Step 7. Tighten hand throttle cable.
Step 8. Turn hand throttle knob counter clockwise (−) all the way to the stop.

CAUTION

Do not let engine exceed 1000 RPM. When checking adjustment if RPM begins to exceed 1000 RPM, turn hand throttle counter clockwise immediately. Damage to engine could result.

Step 9. Slowly turn hand throttle clockwise (+) all the way to the stop. Check engine RPM.
Step 10. Turn hand throttle counter clockwise (−) all the way to the stop.
Step 11. Turn off engine. Refer to TM 9-2350-272-10.
Step 12. Put engine hood in place.



TA259200

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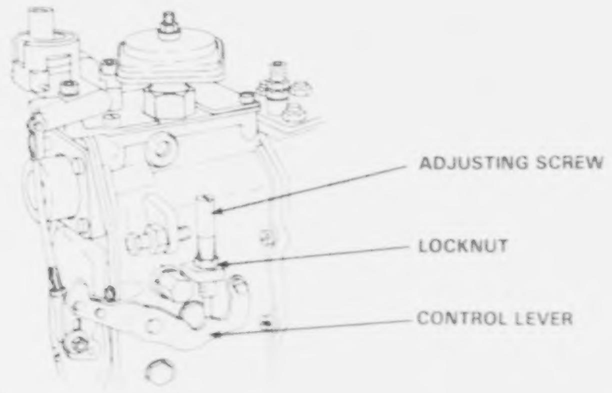
3-15. ADJUST IDLE SPEED.

Step 1. Start engine. Allow engine to reach operating temperature.
Step 2. Loosen locknut.
Step 3. Turn adjusting screw until engine speed on tachometer reads 750 to 850 RPM.
Step 4. Tighten lock nut.
Step 5. Stop engine.


ADJUSTING SCREW
LOCKNUT
CONTROL LEVER

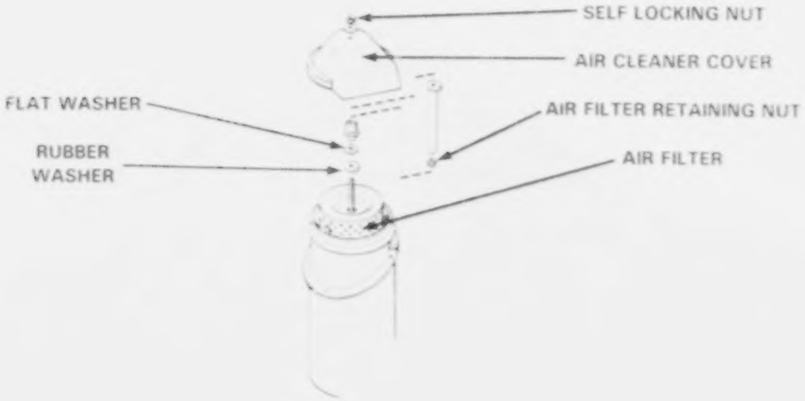
3-16. REMOVE AND REPLACE ENGINE AIR FILTER.

WARNING

NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel. Injury to personnel could result.

a. Remove.

Step 1. Loosen and remove self locking nut and washer on top of air cleaner cover.
Step 2. Remove air cleaner cover.
Step 3. Loosen and remove nut on top of air filter.
Step 4. Remove air cleaner, with two spacers and two washers.


SELF LOCKING NUT
AIR CLEANER COVER
FLAT WASHER
AIR FILTER RETAINING NUT
RUBBER WASHER
AIR FILTER

TA259201

b. Replace.

Step 1. Put air filter in place.
Step 2. Put on washers, spacer and air filter retaining nut. Tighten nut.
Step 3. Put air cleaner cover in place. Screw on and tighten self locking nut and washer.

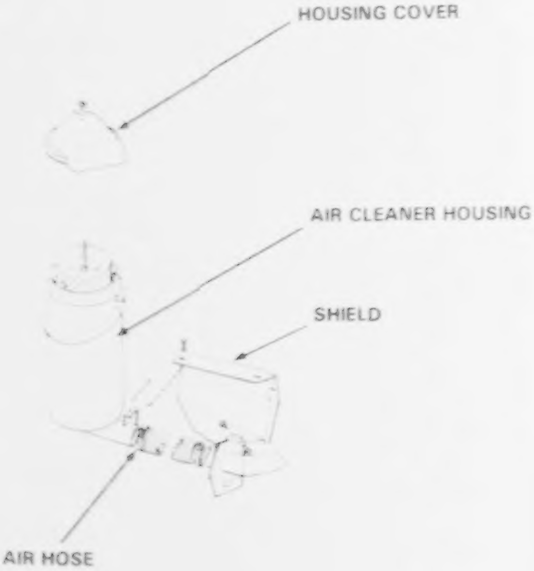
3-17. REMOVE AND REPLACE AIR CLEANER HOUSING.

a. Remove.

Step 1. Remove shield.
Step 2. Disconnect air hose.
Step 3. Remove housing cover.
Step 4. Remove mounting screws.
Step 5. Remove housing.

b. Replace.

Step 1. Put sealant around mounting surface.
Step 2. Put housing in place.
Step 3. Put in mounting screws. Tighten screws.
Step 4. Connect air hose.
Step 5. Put shield over air hose.
Step 6. Put in shield screws. Tighten screws.



TA259202

3-18. REMOVE AND REPLACE EXPANSION VESSEL.

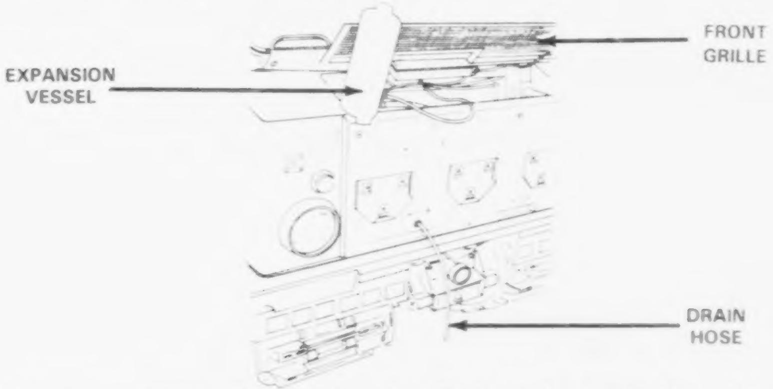
a. Remove.

Step 1. Open front grille.
Step 2. Remove plug in front of cover.
Step 3. Pull drain hose out.
Step 4. Remove elastic band from expansion vessel.
Step 5. Lift expansion vessel and support it on front of car.

WARNING

Let engine cool completely. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant may result.

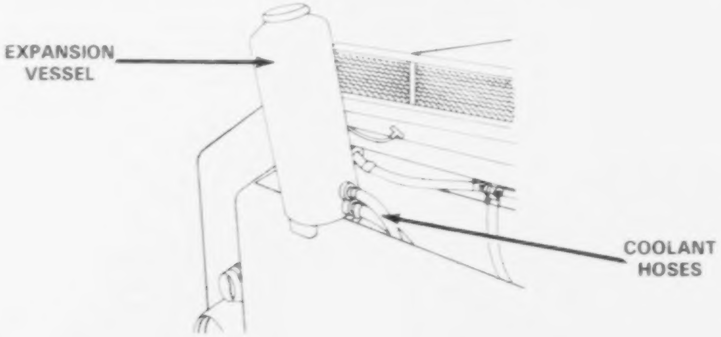
Step 6. Remove expansion vessel cap.



Step 7. Open radiator drain valve. Drain coolant until expansion vessel is empty.
Step 8. Close drain valve.
Step 9. Loosen two coolant hoses at expansion vessel.
Step 10. Disconnect coolant hoses.
Step 11. Remove expansion vessel.

b. Replace.

Step 1. Support expansion vessel on front of car.
Step 2. Connect two coolant hoses to expansion vessel. Tighten hose clamps.



TA259203

Step 3. Put expansion vessel in place.
Step 4. Secure expansion vessel with the elastic strap.
Step 5. Fill expansion vessel with coolant. Refer to TB 750-651 for correct mixture.
Step 6. Operate engine. Bring coolant to operating temperature. Refer to TM 9-2350-272-10.
Step 7. Check for leaks.
Step 8. Add coolant as necessary.
Step 9. Stop engine.
Step 10. Put expansion vessel cap in place.
Step 11. Push drain hose back in carrier.
Step 12. Put in and tighten plug.
Step 13. Close and secure grille.

3-19. REMOVE AND REPLACE RADIATOR.

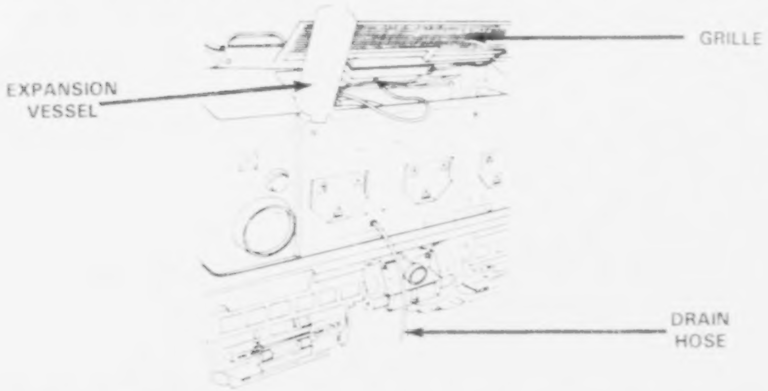
a. Remove.

Step 1. Remove front grille.
Step 2. Remove plug in front of car.
Step 3. Pull drain hose out.
Step 4. Remove elastic band from around expansion vessel.
Step 5. Lift expansion vessel and support it on front of car.

WARNING

Let engine cool completely. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant may result.

Step 6. Remove expansion vessel cap.

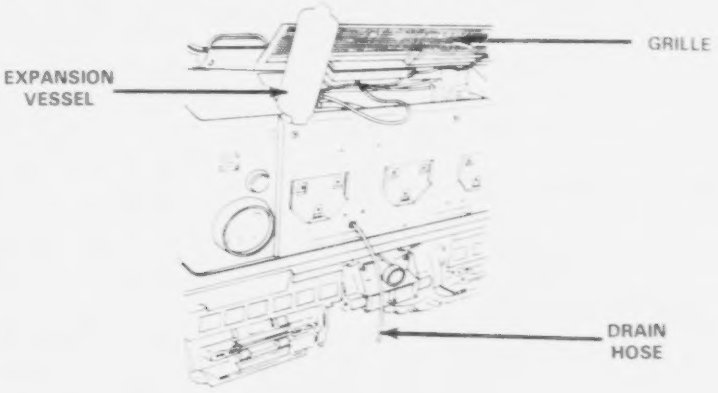


Step 7. Open radiator drain valve. Drain radiator.
Step 8. Remove engine right side access cover.
Step 9. Remove engine left side access cover.
Step 10. Remove four bolts and washers holding cover over radiator and air filter hoses in front of passenger seat.
Step 11. Disconnect coolant hoses from radiator and expansion vessel.
Step 12. Remove expansion vessel.
Step 13. Remove hydraulic tank. Refer to paragraph 3-110.
Step 14. Remove right side front grill holder.
Step 15. Disconnect lower hydraulic tank hose at hydraulic pump.
Step 16. Remove radiator mounting screws.
Step 17. Remove radiator.

TA259204

b. Replace.

Step 1. Put radiator in place and connect lower hydraulic hose to hydraulic pump and tighten clamp.
Step 2. Pull radiator and hydraulic hoses up through hole at bottom of radiator compartment.
Step 3. Slide radiator hoses on bottom of radiator and tighten clamps.
Step 4. Put in and tighten radiator mounting screws.
Step 5. Put on right side grill holder.
Step 6. Support expansion vessel on front of carrier.
Step 7. Connect all other radiation and expansion vessel hose.
Step 8. Put hydraulic tank in place. Refer to paragraph 3-110.
Step 9. Close radiator drain valve.
Step 10. Fill and bleed cooling system. Refer to paragraph 3-23.
Step 11. Put expansion vessel in place and secure with elastic band.
Step 12. Check all hose connects for leaks. Tighten loose hose connections.
Step 13. Push drain hose back in carrier.
Step 14. Put in and tighten plug in front carrier.
Step 15. Attach windshield washer hose. Close and secure grille.
Step 16. Put right and left engine access covers in place.
Step 17. Put cover for air filter and radiator hoses in place.



3-20. REMOVE AND REPLACE RADIATOR FAN TOWER AND V-BELT PULLEY.

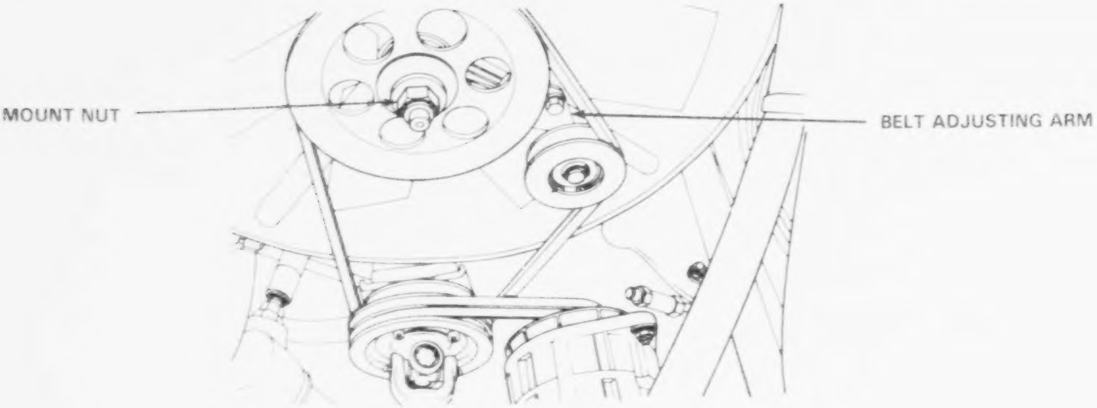
a. Remove.

Step 1. Remove radiator assembly. Refer to paragraph 3-19.
Step 2. Loosen belt adjusting arm. Slide V-belt off top of pulley.
Step 3. Remove nut, washer and bolt holding pulley and radiator fan. Remove fan and pulley.

b. Replace.

Step 1. Put pulley and radiator fan in place. Put on and tighten bolt, nut and washer.
Step 2. Slide V-belt over top of pulley.
Step 3. Tighten belt adjusting arm.
Step 4. Check and adjust belt deflection. Refer to paragraph 3-5.
Step 5. Replace radiator assembly. Refer to paragraph 3-19.

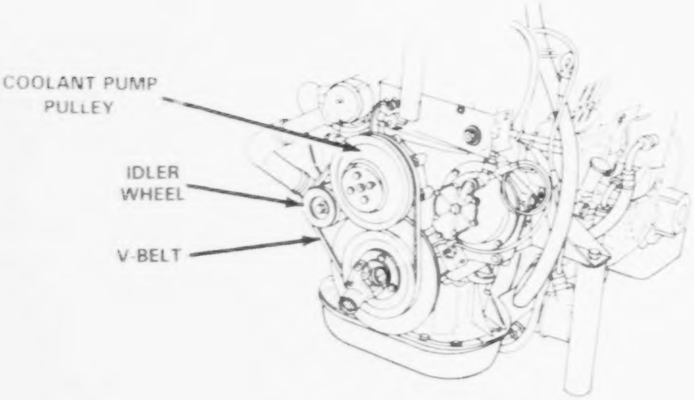
TA259205


MOUNT NUT
BELT ADJUSTING ARM

3-21. REMOVE AND REPLACE COOLANT PUMP AND HOUSING.

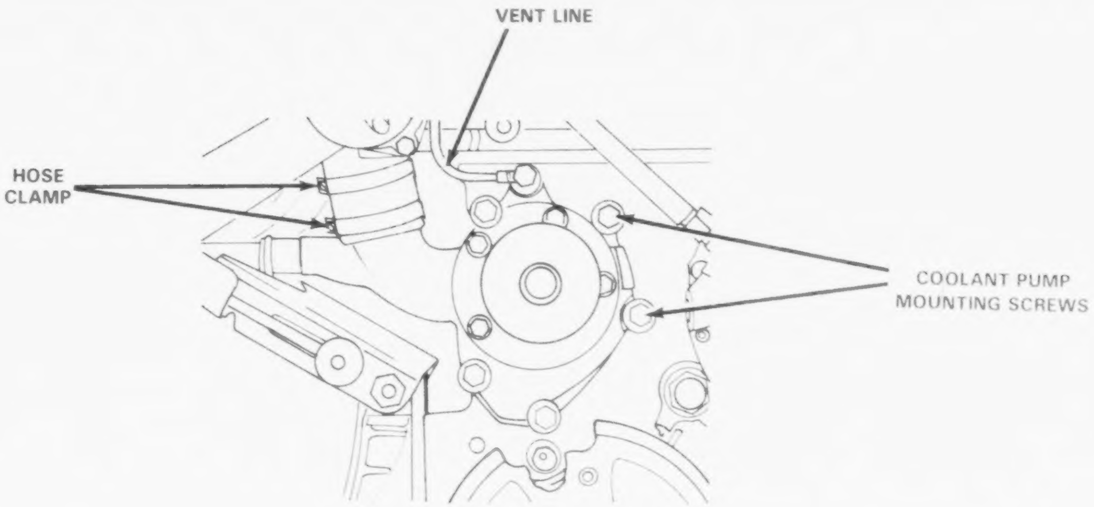
a. Remove.

Step 1. Remove power pack. Refer to paragrpah 3-2.
Step 2. Loosen idler wheel.
Step 3. Remove V-belt.
Step 4. Remove four screws, remove coolant pump pulley.


COOLANT PUMP PULLEY
IDLER WHEEL
V-BELT

TA259206

Step 5. Clean coolant pump and surrounding area.
Step 6. Loosen hose clamps at coolant pump.
Step 7. Remove two screws and remove vent line.
Step 8. Remove coolant pump mounting screws. Remove coolant pump.



CAUTION

Dirt and parts of gasket entering cooling system could block circulation of coolant causing engine damage.

Step 9. Cover open area on engine block.
Step 10. Clean coolant pump mounting area.
Step 11. Remove five screws mounting coolant pump to housing. Separate housing and pump. Remove and discard gasket.

b. Replace.

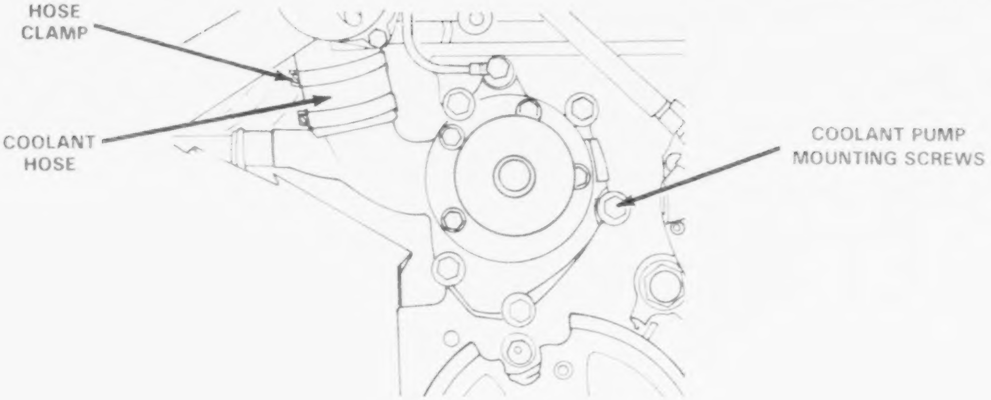
Step 1. Place housing, new gasket and pump together and put in and tighten five screws.
Step 2. Connect coolant pump to coolant hose. Do not tighten clamp.
Step 3. Put new gasket and coolant pump housing in place.

CAUTION

Do not over tighten pump housing mounting screws, housing may crack.

Step 4. Put in coolant pump mounting screws. Torque screws to 8 lb. ft. (10 Nm).
Step 5. Tighten hose clamp.
Step 6. Put vent line in place and tighten two screws.

TA259207

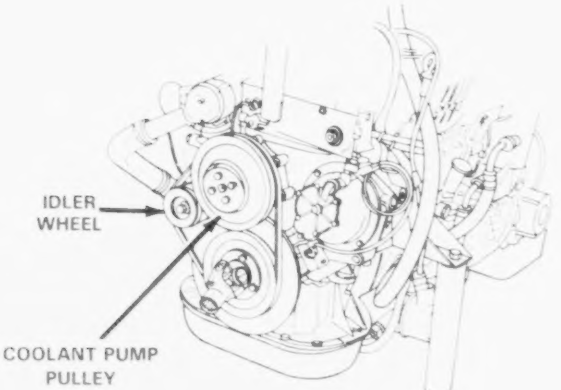

HOSE CLAMP
COOLANT HOSE
COOLANT PUMP MOUNTING SCREWS

Step 7. Put pump pulley in place.
Step 8. Screw in and tighten four screws.
Step 9. Put V-belt in place. Refer to paragraph 3-5.
Step 10. Place straight edge on pump pulley and idler wheel.
Step 11. Move idler wheel outward to adjust V-belt.

NOTE

Pump V-belt must have 3/8 in. (10 mm) deflection when a firm pressure is applied to the belt between the pump pulley and idler wheel.

Step 12. Measure deflection of V-belt.
Step 13. Tighten idler wheel adjusting screw.


IDLER WHEEL
COOLANT PUMP PULLEY

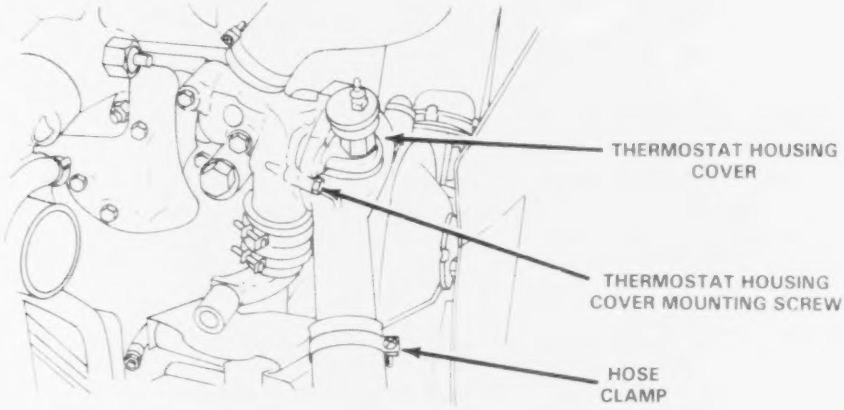
Step 14. Replace power pack. Refer to paragraph 3-2.
Step 15. Start engine and check for leaks.

TA259208

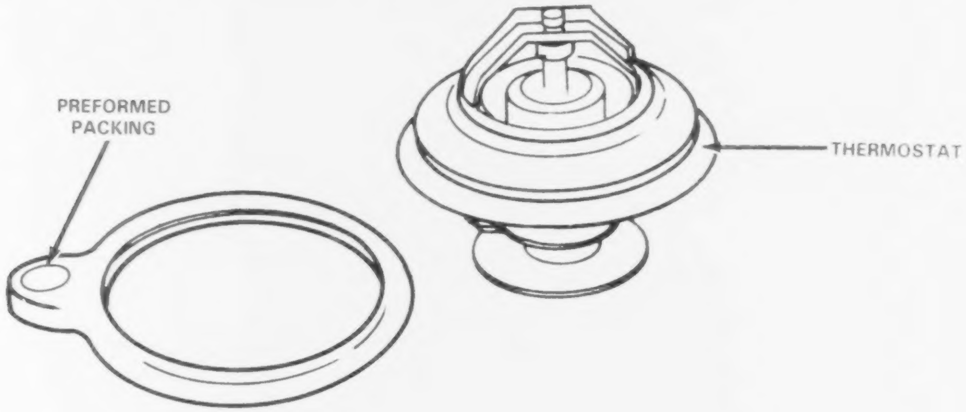
3-22. REMOVE AND REPLACE THERMOSTAT.

a. Remove.

Step 1. Remove engine hood.
Step 2. Drain cooling system. Refer to paragraph 3-23.
Step 3. Loosen hose clamp.
Step 4. Pull hose off thermostat housing cover.
Step 5. Remove thermostat housing cover mounting screws.
Step 6. Remove thermostat housing cover.


THERMOSTAT HOUSING COVER
THERMOSTAT HOUSING COVER MOUNTING SCREW
HOSE CLAMP

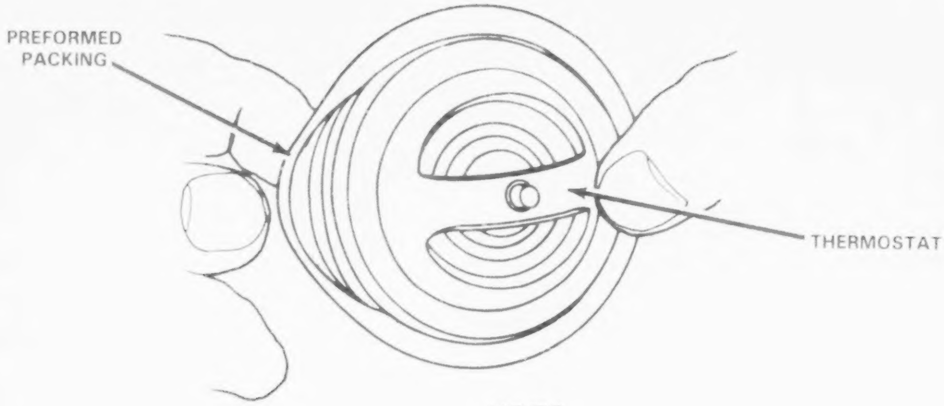
Step 7. Remove thermostat with preformed packing.


PREFORMED PACKING
THERMOSTAT

b. Replace.

Step 1. Put new preformed packing on thermostat.

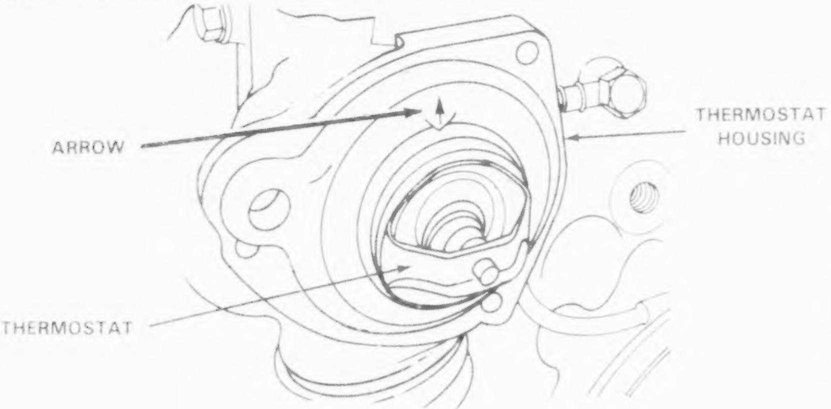
TA259209


PREFORMED PACKING
THERMOSTAT

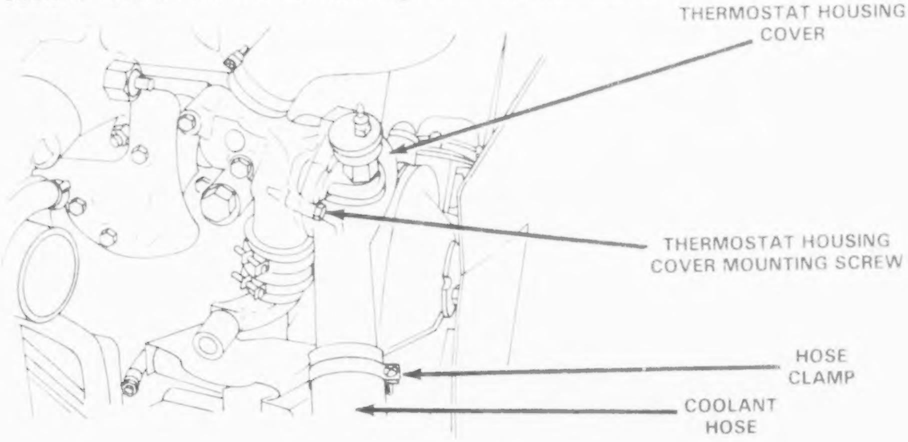
NOTE

Arrow on thermostat must point up.

Step 2. Put thermostat with preformed packing in place.


ARROW
THERMOSTAT HOUSING
THERMOSTAT

Step 3. Put thermostat housing cover in place.
Step 4. Put in mounting screws. Torque screws to 7 to 9 lb. ft. (9 to 11 Nm).
Step 5. Put coolant hose on thermostat housing cover. Tighten clamp.


THERMOSTAT HOUSING COVER
THERMOSTAT HOUSING COVER MOUNTING SCREW
HOSE CLAMP
COOLANT HOSE

Step 6. Fill and bleed cooling system. Refer to paragraph 3-23.

TA259210

3-23. DRAIN, FILL, BLEED COOLING SYSTEM.

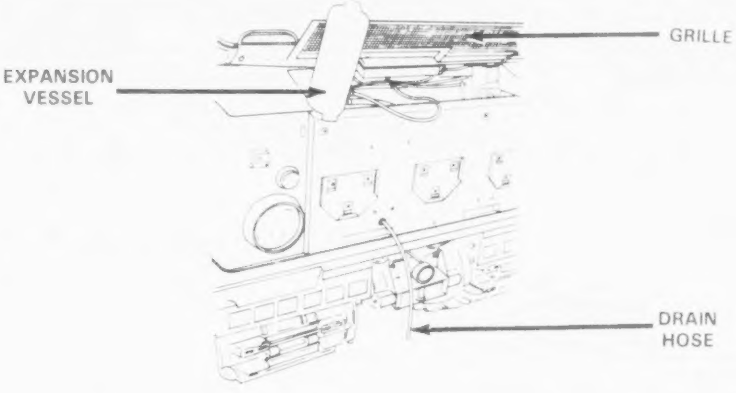
a. Drain.

Step 1. Open front grille.
Step 2. Remove plug from front of car.
Step 3. Pull drain hose out.
Step 4. Remove elastic band from expansion vessel.
Step 5. Lift expansion vessel and support it on front of car.

WARNING

Let engine cool completely. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant could result.

Step 6. Remove expansion vessel cap.
Step 7. Open radiator drain valve and drain coolant.
Step 8. Close radiator drain valve.
Step 9. Remove winch from stowage bracket.



Step 10. Remove radio mount bracket, engine hood and cover.

WARNING

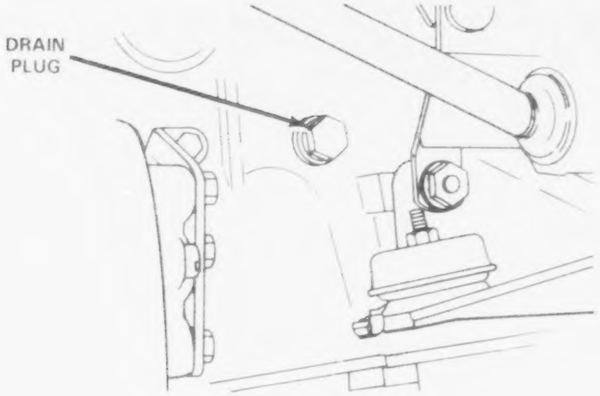
Use caution when removing drain plug, turbocharger cover can cut you.

NOTE

Drain plug is located on the engine right rear, in front of starter.

Step 11. Remove coolant drain plug from crankcase and drain coolant.
Step 12. Put in and tighten coolant drain plug.

TA259211



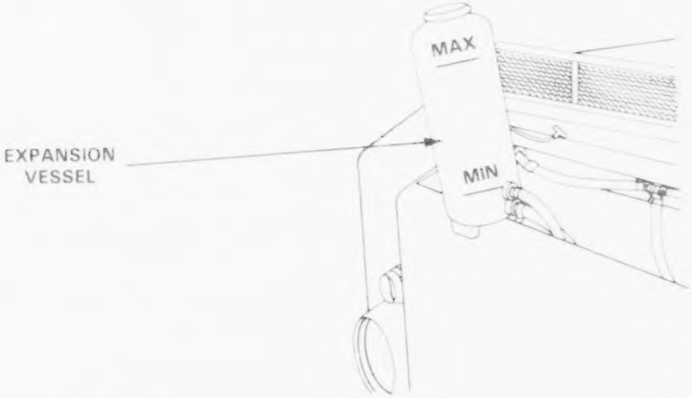
b. **Fill and Bleed.**

Step 1. Support expansion vessel on front of car.
Step 2. Open bleed tap on coolant pipe.

NOTE

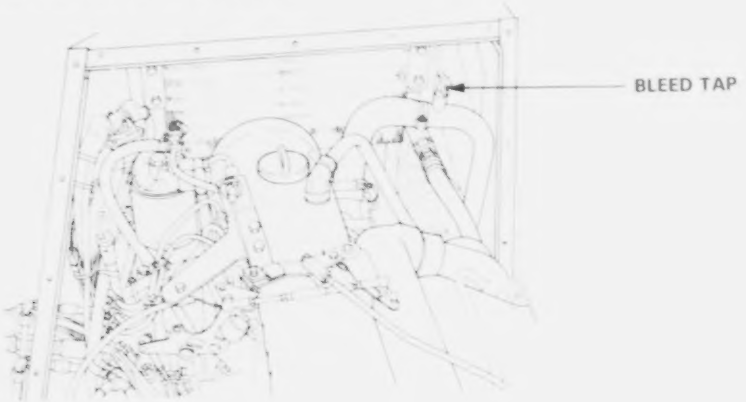
Make sure rear car coolant valves are open.

Step 3. Fill expansion vessel with coolant until coolant flows from bleed tap. Close bleed tap. Refer to TB 750-651 for correct mixture.
Step 4. Start engine. Turn on front and rear car heaters.
Step 5. Add coolant keeping expansion vessel filled above the minimum mark.



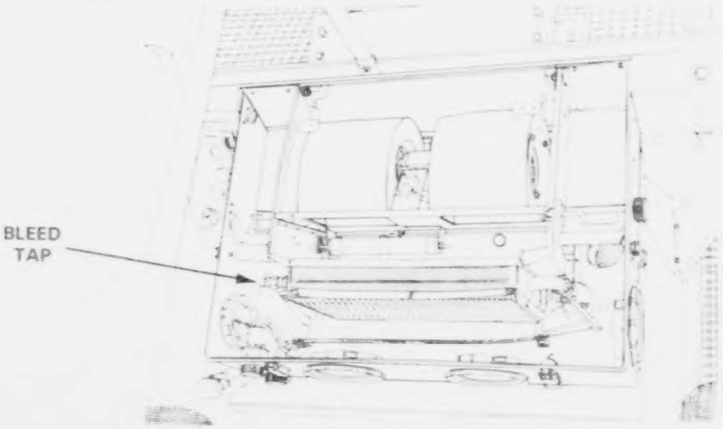
TA259212

Step 6. Open bleed tap on coolant pipe until coolant flows with no air bubbles. Close tap, when coolant is free of air bubbles.



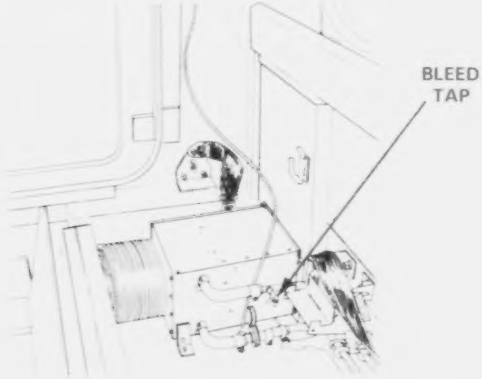
Step 7. Check and add coolant as necessary.

Step 8. Open bleed tap in front car heater. Close tap when coolant flows with no air bubbles.



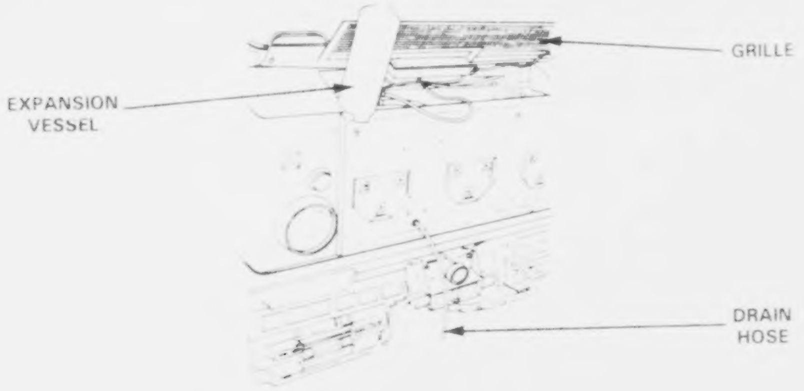
Step 9. Check and add coolant as necessary.

Step 10. Open bleed tap on heater in rear car. Close tap when coolant flows with no air bubbles.



TA259213

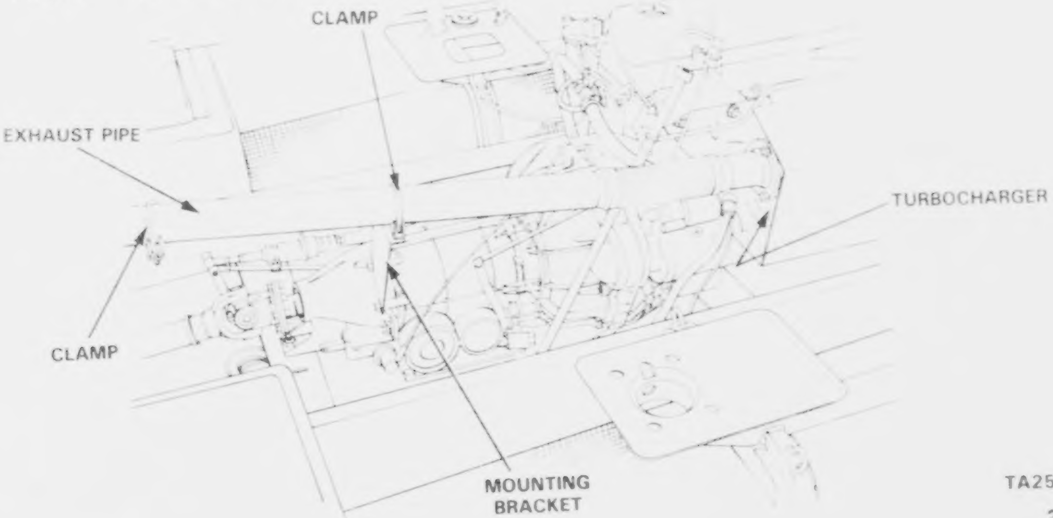
Step 11. Check and add coolant as necessary.
Step 12. Put expansion vessel in place.
Step 13. Put elastic band around expansion vessel.
Step 14. Put expansion vessel cap in place.
Step 15. Push drain hose back in car.
Step 16. Put in and tighten plug in front of car.
Step 17. Close grille.
Step 18. Replace engine hood, cover, and radio mounting bracket.
Step 19. Install winch in stowage bracket.


GRILLE
EXPANSION VESSEL
DRAIN HOSE

3-24. REMOVE AND REPLACE EXHAUST PIPE.

a. Remove.

Step 1. Remove winch.
Step 2. Remove radio, antenna cable, and mounting bracket.
Step 3. Remove engine hood and cover.
Step 4. Remove mounting nuts connecting exhaust pipe to turbocharger.
Step 5. Remove clamp connecting exhaust pipe to muffler inlet pipe.
Step 6. Remove clamp holding exhaust pipe to mounting bracket.
Step 7. Remove exhaust pipe and gasket.


CLAMP
EXHAUST PIPE
TURBOCHARGER
CLAMP
MOUNTING BRACKET

TA259214

b. Replace.

Step 1. Put exhaust pipe in place.
Step 2. Put clamp in place at muffler inlet pipe. Do not tighten.
Step 3. Put clamp in place holding exhaust pipe to mounting bracket. Do not tighten.
Step 4. Put on nuts connecting exhaust pipe to turbocharger. Tighten nuts.
Step 5. Tighten all clamps.
Step 6. Operate engine and check for leaks.
Step 7. Replace engine hood and cover.
Step 8. Replace radio, antenna cable, and mounting bracket.
Step 9. Install winch in stowage bracket.

3-25. REMOVE AND REPLACE MUFFLER.

a. Remove.

Step 1. Remove winch.
Step 2. Remove radio, antenna cable and mounting bracket.
Step 3. Remove engine hood and cover.
Step 4. Loosen clamp, disconnect exhaust pipe to muffler connection.
Step 5. Remove rear grille.
Step 6. Disconnect muffler to mounting bracket connections.
Step 7. Remove muffler up and out of rear air shaft.

b. Replace.

Step 1. Put muffler in place.
Step 2. Connect muffler to exhaust pipe. Tighten clamp.
Step 3. Connect muffler to mounting bracket.
Step 4. Operate engine and check for leaks.
Step 5. Replace rear grille.
Step 6 Replace engine hood and cover.
Step 7. Replace radio, antenna cable and mounting bracket.
Step 8. Replace winch.

3-26. REMOVE AND REPLACE TURBOCHARGER OIL RETURN LINE.

a. Remove

Step 1. Loosen and remove two screws from upper line section of exhaust gas turbocharger.
Step 2. Push upper line section down, pull outward and remove.
Step 3. Push lower line section slightly down and force contoured sealing ring out of oil pan.
Step 4. Pull out lower line section in upward direction together with contoured sealing ring.

b. Replace

Step 1. Check contoured sealing ring and preformed packing for damage. Replace if damaged.

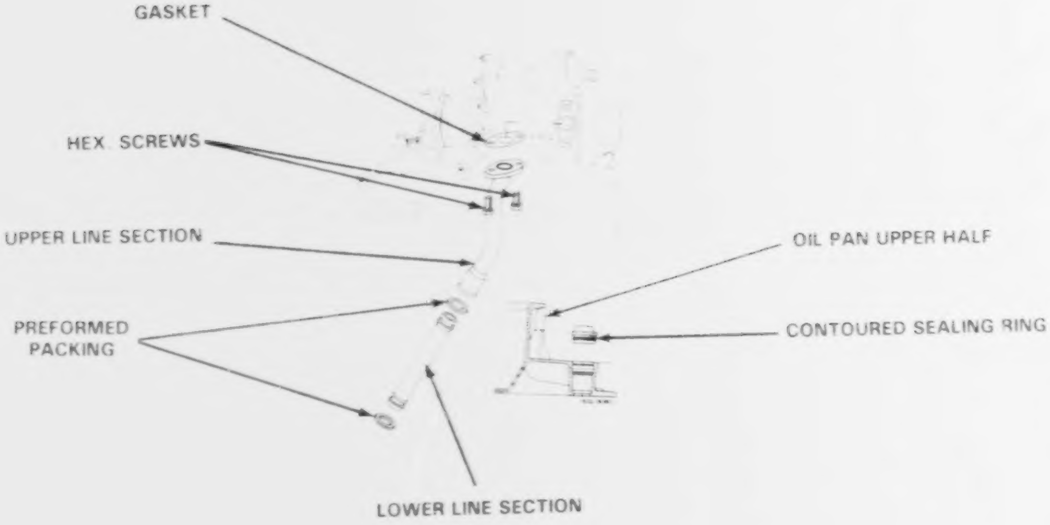
Step 2. Put contoured sealing ring in place.

Step 3. Put lower line section into contoured sealing ring.

Step 4. Put upper line section onto lower line section.

Step 5. Using a new gasket put upper line section in place at turbocharger.

Step 6. Put in and tighten two screws.


GASKET
HEX. SCREWS
UPPER LINE SECTION
PREFORMED PACKING
OIL PAN UPPER HALF
CONTOURED SEALING RING
LOWER LINE SECTION

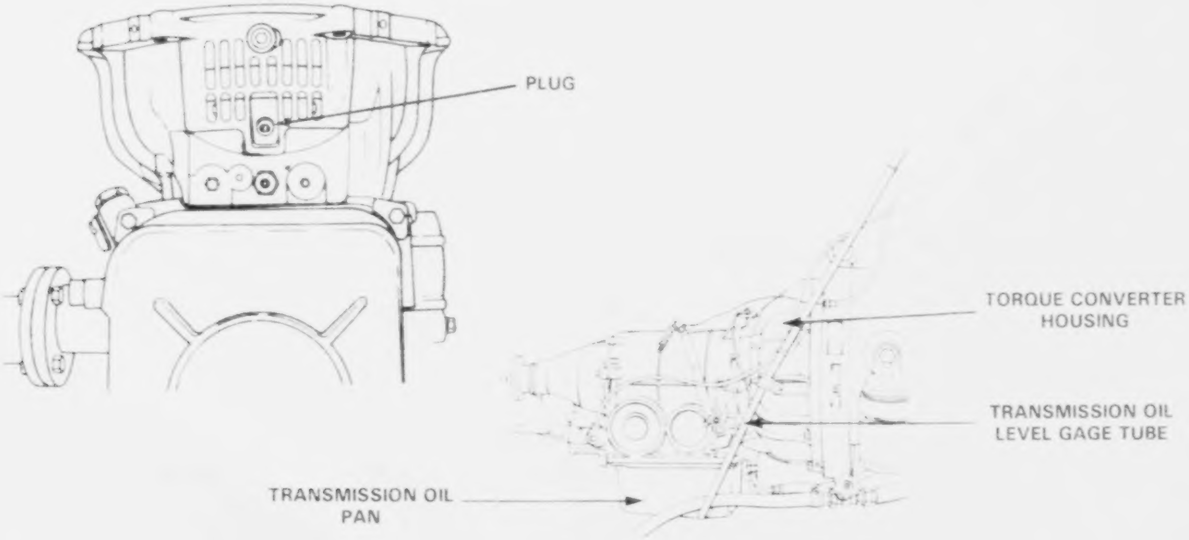
TA259215

Section III. DRIVE TRAIN MAINTENANCE INSTRUCTIONS.

3-27. DRAIN AND REFILL TRANSMISSION OIL.

a. Drain Transmission

Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Place 12 inches of cribbing under transmission and engine mounts.
Step 3. Put drain pan under transmission.
Step 4. Unscrew transmission fluid level gage tube nut. Drain transmission.
Step 5. Remove propeller shaft flange from front of engine.
Step 6. Place 27 mm socket on pulley nut and turn engine until torque converter drain plug is at the bottom.
Step 7. Remove torque converter drain plug. Drain oil.
Step 8. Put new seal on drain plug.
Step 9. Screw drain plug into torque converter. Torque drain plug to 14 lb. ft. (19 Nm)
Step 10. Put transmission oil level gage tube in place. Tighten tube nut.



b. Fill Transmission.

Step 1. Replace power pack. Refer to paragraph 3-2.
Step 2. Remove transmission oil dipstick.
Step 3. Pour in six quarts transmission oil. Refer to LO 9-2350-272-12.
Step 4. Check and add oil as necessary. Refer to LO 9-2350-272-12.

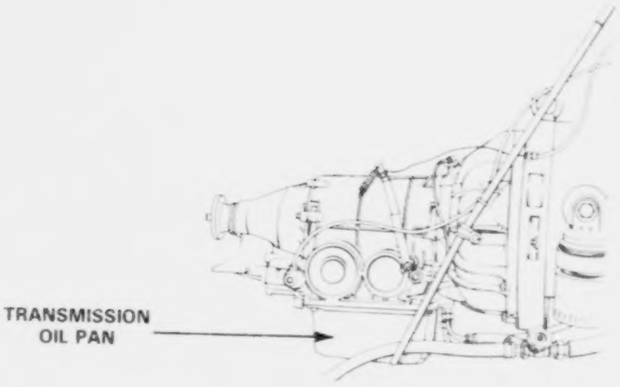
3-28. REMOVE AND REPLACE TRANSMISSION OIL FILTER.

a. Remove

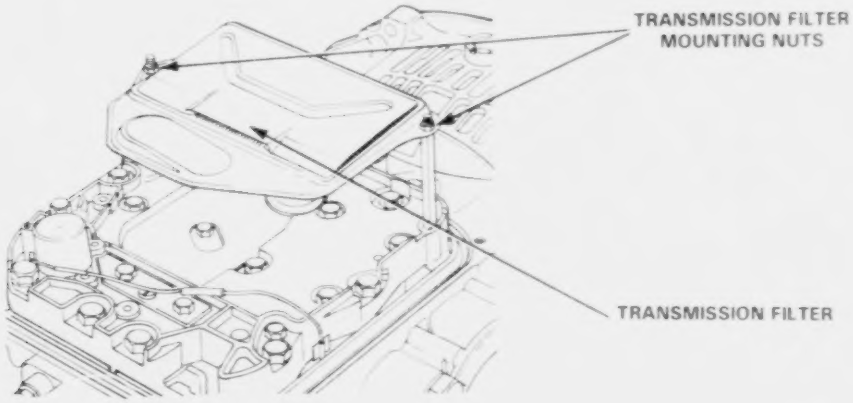
Step 1. Drain transmission oil. Refer to paragrpah 3-27.

TA259216

Step 2. Remove Transmission oil pan nuts. Remove pan.


TRANSMISSION OIL PAN

Step 3. Remove two nuts holding transmission filter in place. Remove filter.


TRANSMISSION FILTER MOUNTING NUTS
TRANSMISSION FILTER

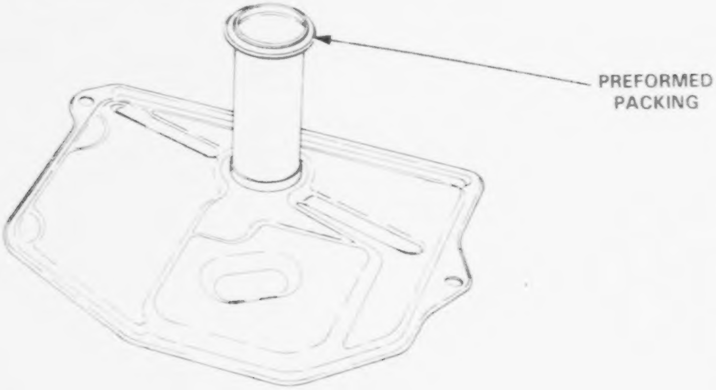
b. Replace.

NOTE

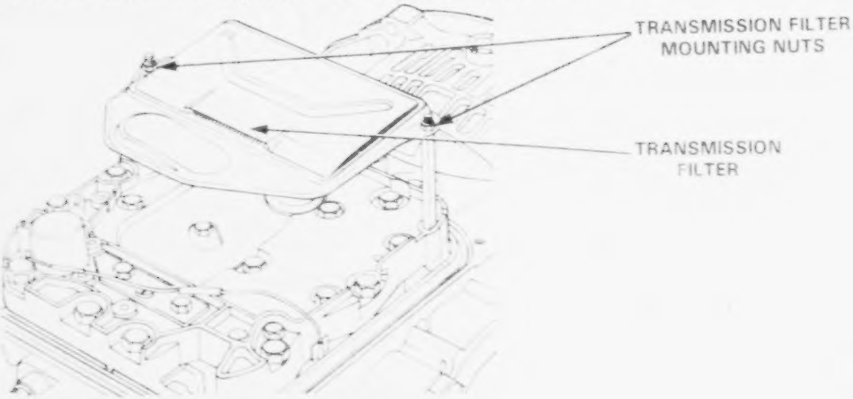
Some transmission filters have cork gaskets. Cork gaskets on transmission filter must be replaced with a preformed packing.

TA259217

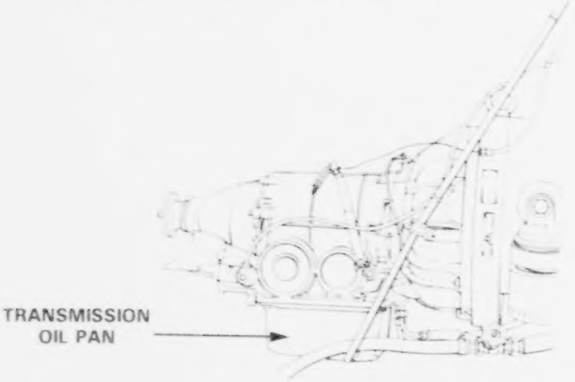
Step 1. Put preformed packing on transmission filter.


PREFORMED
PACKING

Step 2. Put transmission filter in place.
Step 3. Put on two mounting nuts. Torque nuts to 35 lb. in. (4 Nm)


TRANSMISSION FILTER
MOUNTING NUTS
TRANSMISSION
FILTER

Step 4. Put transmission oil pan in place.
Step 5. Put in oil pan screws, torque screws to 62 lb. in. (7 Nm)


TRANSMISSION
OIL PAN

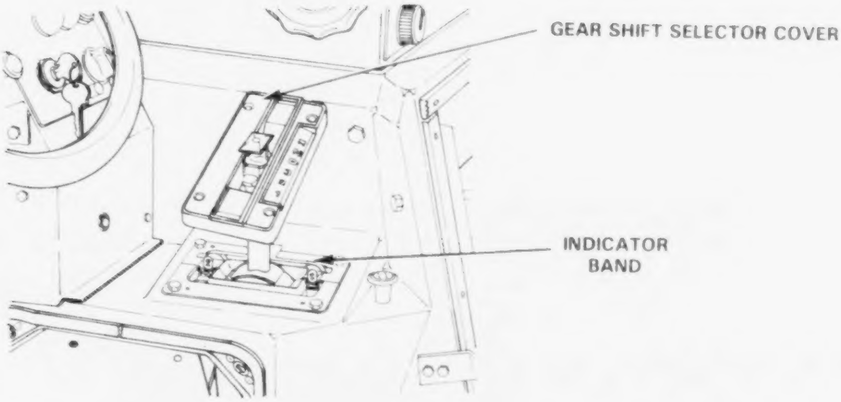
Step 6. Fill transmission. Refer to paragraph 3-27.

TA259218

3-29. REMOVE AND REPLACE GEAR SHIFT INDICATOR BAND.

a. Remove.

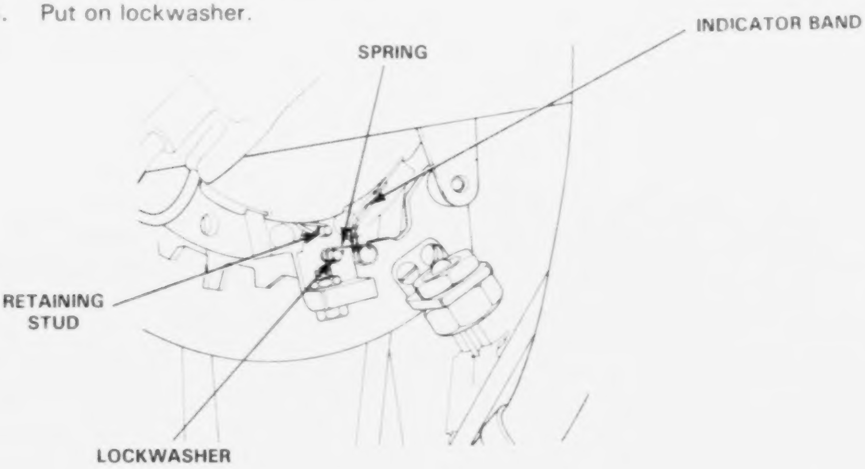
Step 1. Remove engine hood.
Step 2. Remove gear shift selector rubber cap.
Step 3. Remove gear shift selector cover screws. Remove cover.


GEAR SHIFT SELECTOR COVER
INDICATOR BAND

Step 4. Remove lockwasher.
Step 5. Unhook spring. Disconnect spring from indicator band.
Step 6. Remove indicator band.

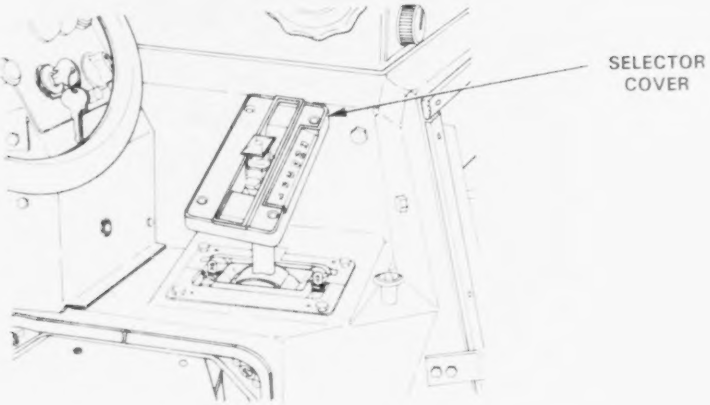
b. Replace.

Step 1. Put indicator band in place. Hook band on retaining stud.
Step 2. Hook sping to indicator band.
Step 3. Put spring in place.
Step 4. Put on lockwasher.


INDICATOR BAND
SPRING
RETAINING STUD
LOCKWASHER

TA259219

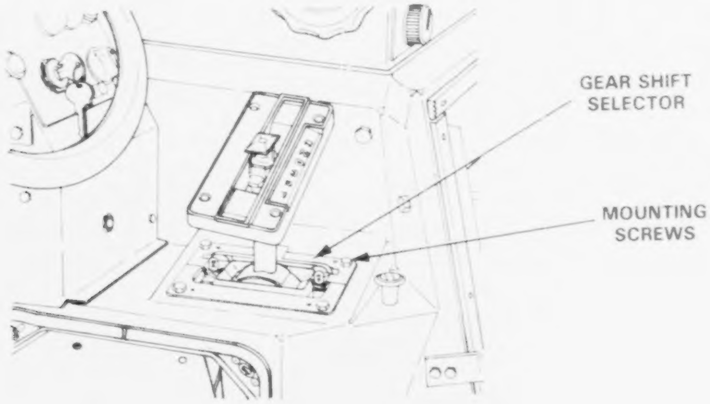
Step 5. Put gear shift selector cover in place.
Step 6. Screw in and tighten screws.
Step 7. Replace rubber cap.
Step 8. Replace engine hood.



3-30. REMOVE AND REPLACE GEAR SHIFT SELECTOR ASSEMBLY.

a. Remove.

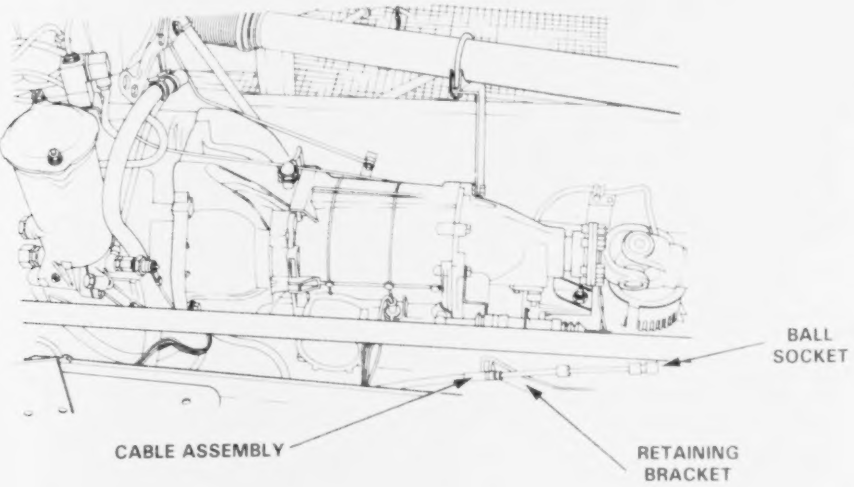
Step 1. Remove engine hood.
Step 2. Remove gear shift selector rubber cap.
Step 3. Remove gear shift selector cover screws. Remove cover.
Step 4. Remove gear shift selector mounting screws.
Step 5. Remove left side access cover.
Step 6. Tag and disconnect electrical wires.



TA259220

Step 7. Disconnect ball socket from retaining bracket arm.

Step 8. Disconnect cable assembly from retaining bracket.


BALL SOCKET
CABLE ASSEMBLY
RETAINING BRACKET

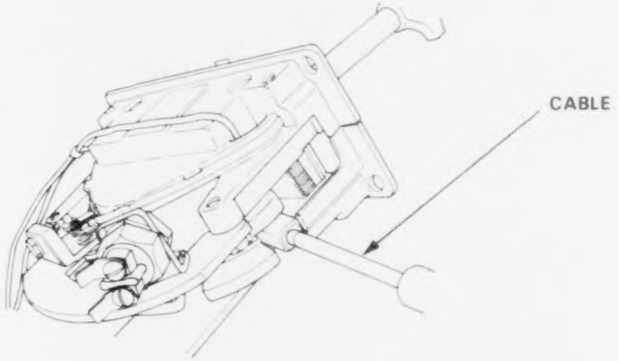
Step 9. Cut wire ties.

Step 10. Remove selector with cable.

Step 11. Remove nuts, screws and clamps holding cable assembly to gear shift lever assembly.

Step 12. Place selector between N and D.

Step 13. Loosen lock screw unhook cable.

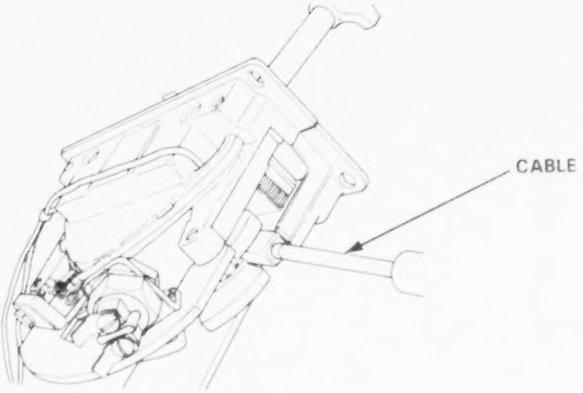


b. Replace.

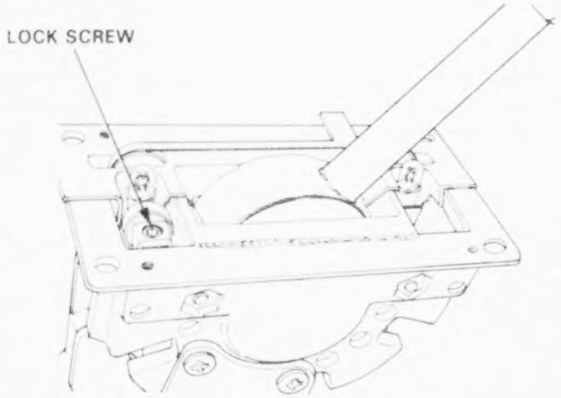
Step 1. Place shift lever between N and D.

TA259221

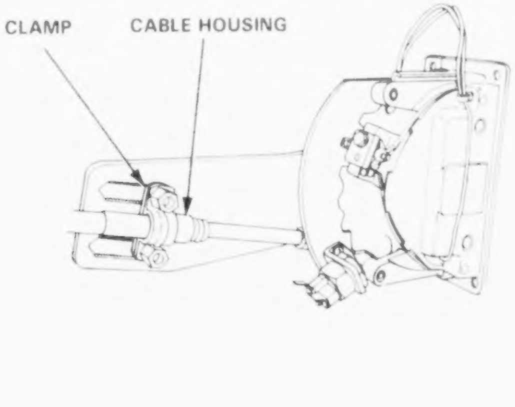
Step 2. Put cable in place in shift selector.



Step 3. Tighten lock screw.

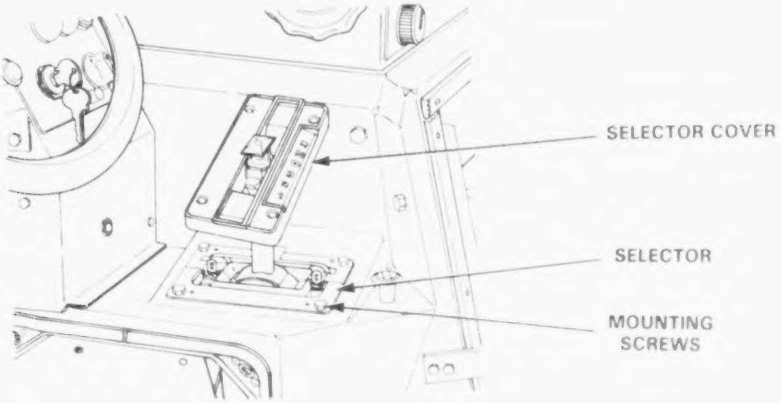


Step 4. Put cable in place on selector cable mounting bracket.
Step 5. Put clamp in place. Push cable housing and clamp to top position. Tighten clamp.

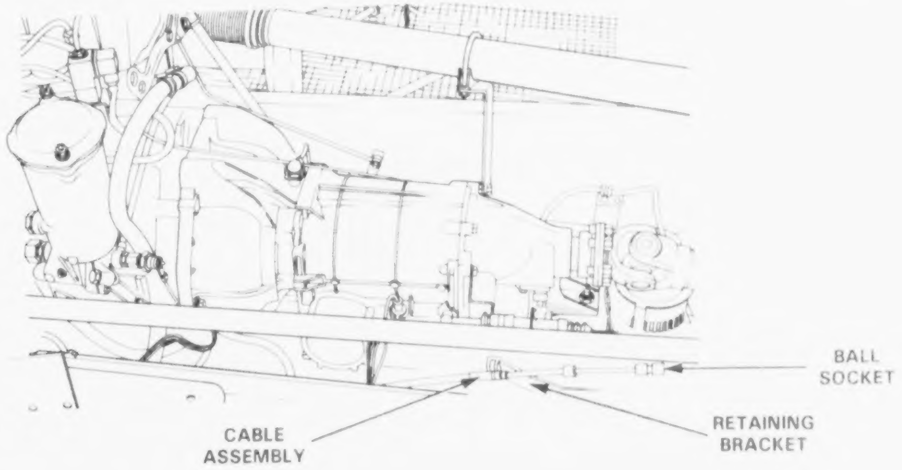

CLAMP
CABLE HOUSING

TA259222

Step 6. Put gear shift selector with cable in place.
Step 7. Put in and tighten mounting screws.
Step 8. Using location tags connect electrical wires.
Step 9. Put selector cover in place. Put in and tighten screws.
Step 10. Put gear selector rubber cap in place.



Step 11. Replace left side access cover.
Step 12. Put cable assembly in place. Connect cable assembly to retaining bracket.
Step 13. Connect ball socket to retaining bracket arm.



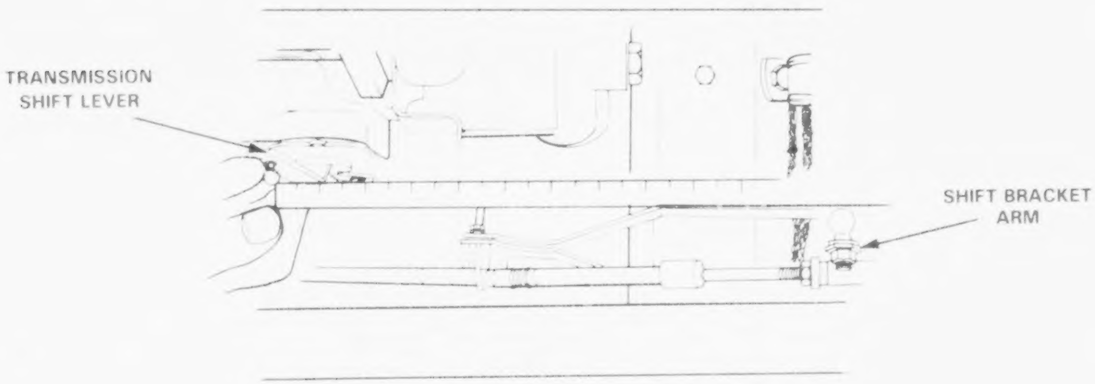
Step 14. Replace wire ties.
Step 15. Check operation. If adjustment is required refer to paragraph 3-31.
Step 16. Replace engine hood.

3-31. ADJUST TRANSMISSION SHIFT LINKAGE.

Step 1. Remove engine hood. Raise and support engine cover.
Step 2. Disconnect shift rod ball socket from transmission shift lever.
Step 3. Place gear shift lever in position 3.
Step 4. Place transmission shift lever in the second position from the front end.

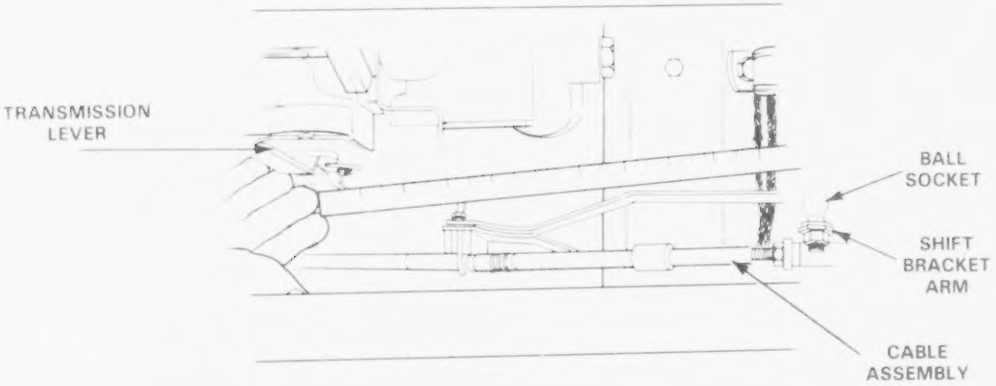
TA259223

Step 5. Measure distance between ball of transmission shift lever and lower ball of the shift bracket arm.


TRANSMISSION SHIFT LEVER
SHIFT BRACKET ARM

Step 6. Measure distance between ball of transmission shift lever and upper ball of shift bracket arm.

Step 7. Screw ball socket on cable assembly in or out to get the same distance between ball joints.


TRANSMISSION LEVER
BALL SOCKET
SHIFT BRACKET ARM
CABLE ASSEMBLY

TA259224

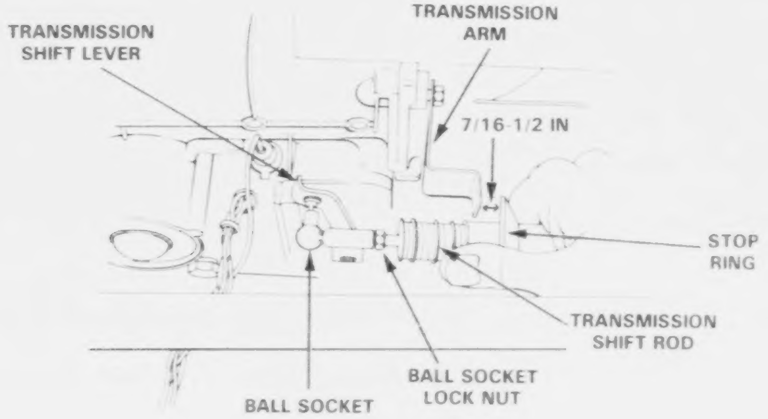
Step 8. Connect transmission shift rod ball socket to transmission shift lever.

Step 9. Measure distance between transmission arm and stop ring on shift rod.

NOTE

Correct measurement is 7/16 to 1/2 in. (12 to 14 mm).

Step 10. Screw front ball socket in or out to get 7/16 to 1/2 in. (12-14 mm) adjustment.


TRANSMISSION SHIFT LEVER
TRANSMISSION ARM
7/16-1/2 IN
STOP RING
TRANSMISSION SHIFT ROD
BALL SOCKET LOCK NUT
BALL SOCKET

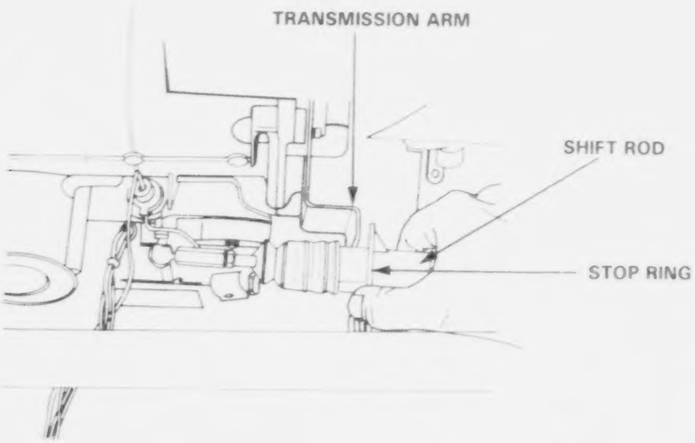
Step 11. Screw rear ball socket of shift rod in or out to fit upper ball joint of shift bracket arm.

Step 12. Tighten ball socket lock nuts.

Step 13. Make sure that 2nd gear and reverse gear on transmission selector and transmission are correct.

Step 14. Shift gear selector into 2nd gear.

Step 15. Push shift rod stop ring toward the rear and measure distance. Correct distance is 3/16 to 3/8 in. (5 to 10 mm).


TRANSMISSION ARM
SHIFT ROD
STOP RING

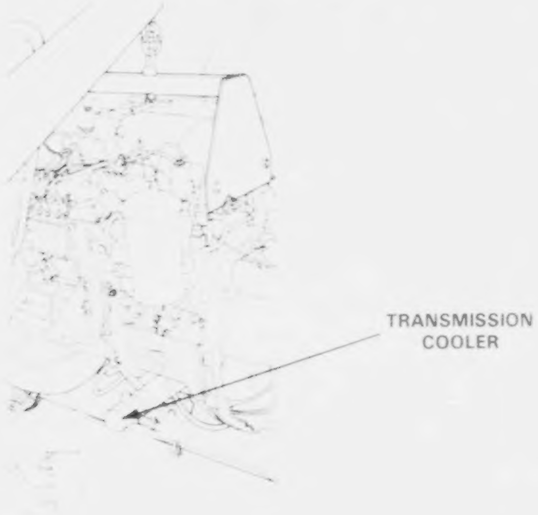
TA259225

Step 16. Shift gear selector into 1st gear.
Step 17. Push gear shift rod stop ring toward rear and measure distance. Correct distance is 3/16 to 3/8 in. (5 to 10 mm).
Step 18. Shift gear selector into 2nd gear and make sure that shift rod extends.
Step 19. Shift gear selector into D. Make sure shift rod is blocked when pressed toward rear.
Step 20. Lower engine cover and replace engine hood.

3-32. REMOVE AND REPLACE TRANSMISSION OIL COOLER.

a. Remove.

Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Tag and disconnect two oil lines and one hose from oil cooler.
Step 3. Loosen two clamps securing oil cooler to mounting bracket.
Step 4. Remove oil cooler from mounting bracket.



b. Replace.

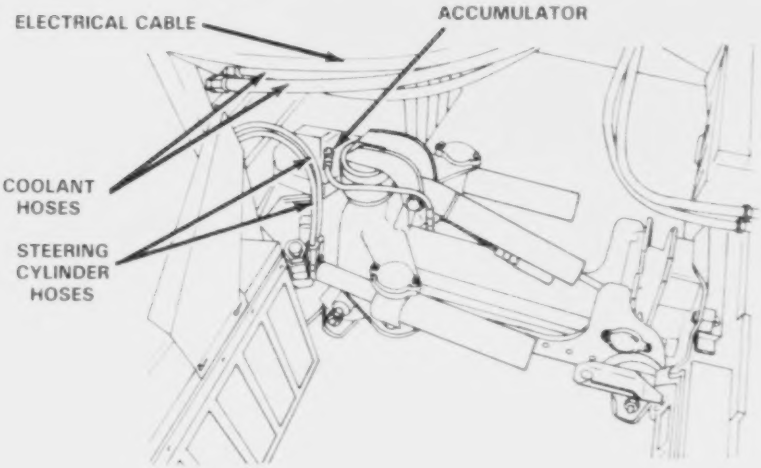
Step 1. Put transmission oil cooler in place. Tighten mounting clamps.
Step 2. Using location tags, put on and tighten two oil lines and hose.
Step 3. Replace power pack. Refer to paragraph 3-2.

TA259226

3-33. REMOVE AND REPLACE TRANSFER ASSEMBLY.

a. Remove.

Step 1. Remove mud flaps. Tag, disconnect and plug steering cylinder hoses.
Step 2. Disconnect propeller shaft from transfer to rear car differential. Refer to paragraph 3-40.
Step 3. Close coolant valves in exhaust air shaft rear of front car.
Step 4. Tag, disconnect and plug coolant hoses in rear of front car.
Step 5. Disconnect electrical cable from rear of front car.
Step 6. Put jack under and support weight of steering unit.
Step 7. Drain air from accumulator, loosen fill plug.
Step 8. Remove four nuts holding steering unit to transfer gear box.

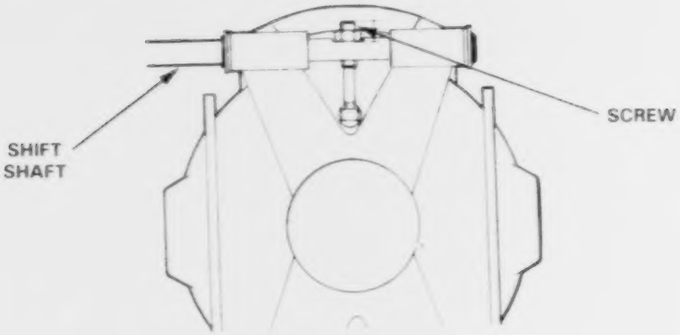


WARNING

Keep personnel clear of carrier's steering unit when separating or connecting cars. Falling steering unit could cause injury to personnel.
Do not attempt to drive carrier. Transfer is not securely mounted at this point. Injury to personnel or damage to equipment could result.

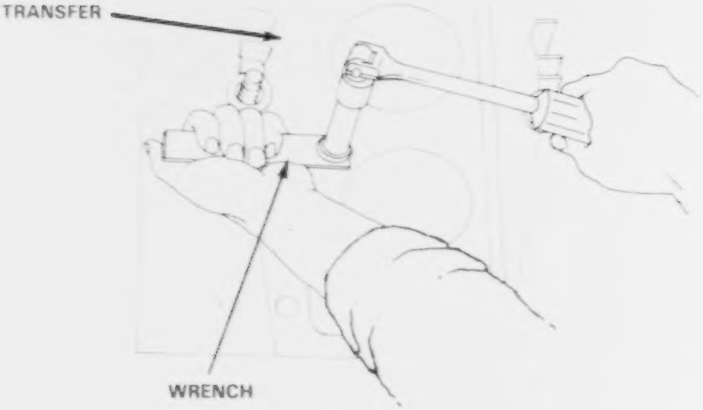
Step 9. Push front car forward.
Step 10. Put jackstand under steering unit.
Step 11. Remove transmission-to-transfer propeller shaft. Refer to paragraph 3-39.
Step 12. Remove heat shield.
Step 13. Release locknut and loosen screw in transfer shift arm to disengage shift shaft.

TA259227


SHIFT SHAFT
SCREW

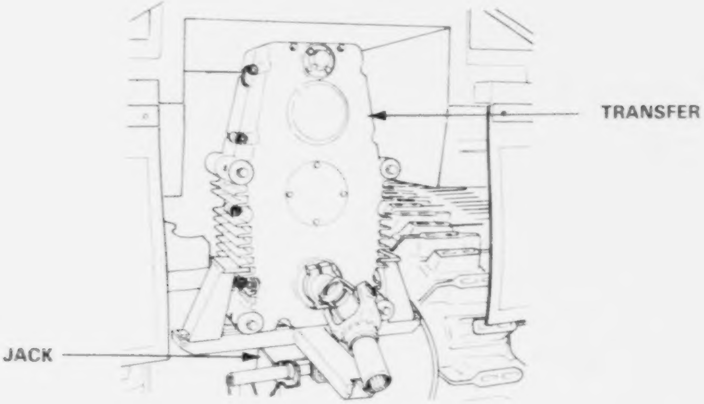
Step 14. Use rope to suspend brake unit.

Step 15. Use wrench to remove screws on backside (as you face transfer) of transfer holding brake to transfer. Refer to Table 2-1, item 8. Place wrench along side of transfer to reach screws.

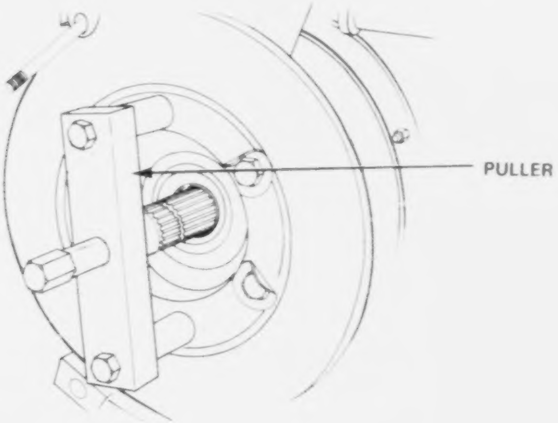

TRANSFER
WRENCH

TA259228

Step 16. Place jack under transfer and lift as needed.



Step 17. Pull transfer out toward rear. If necessary use the puller to press out shaft. Refer to Table 2-1, item 9.



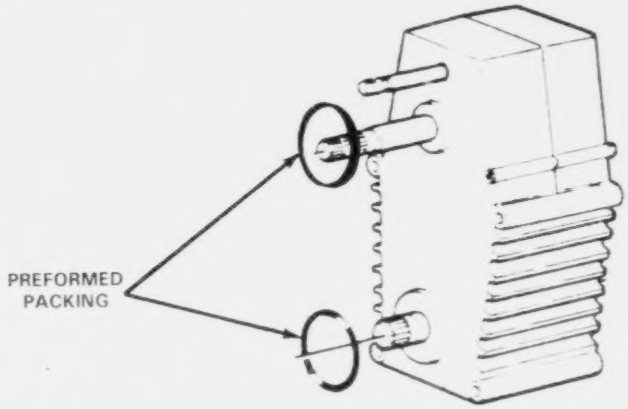
Step 18. Remove propeller shaft adapters on both ends of transfer.

TA259229

b. Replace.

Step 1. Remove retaining clip and support bearing from brake assembly.

Step 2. Put preformed packings on transfer.



Step 3. Put light coat of non petroleum lubricant on rubber bellows for speed shift arm.

Step 4. Connect propeller shaft adapters to both ends of transfer. Torque screws to 36 lb. ft. (49 mm).

NOTE

Make sure that transfer is raised so that it enters chassis beam guide properly. Make sure that propeller shafts fit into splined sleeves. The speed shift rod must enter hole in rubber bellows.

Step 5. Place transfer on floor jack.

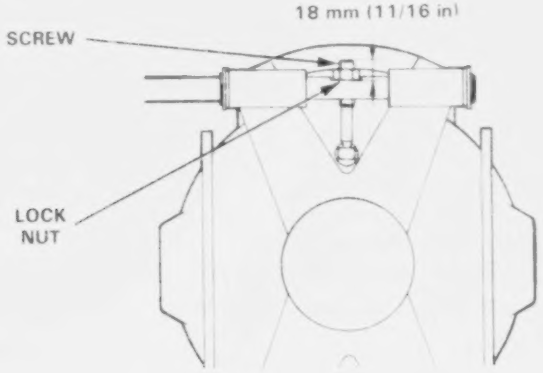
Step 6. Raise jack and put transfer in place.

Step 7. Put brake unit in place on transfer.

Step 8. Put in screws and torque to 23 lb. ft. (31 Nm).

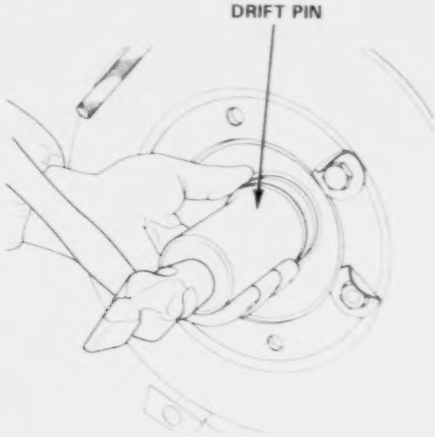
Step 9. Remove rope suspending brake unit.

Step 10. Screw ball screw into gear shift shaft until screw end is 11/16 in. (18 mm) above locknut plane.



TA259230

Step 11. Using drift pin, put on support bearing. Refer to table 2-1, item 16.
Step 12. Put on retaining clip.



Step 13. Put spacer in place on transfer input shaft. Connect propeller shaft from transmission to transfer. Torque screws to 55 lb. ft. (75 Nm).

NOTE

When connecting steering unit to front car, make sure that transfer is positioned correctly. The front universal joint must not be jammed when car and steering unit are connected together.

WARNING

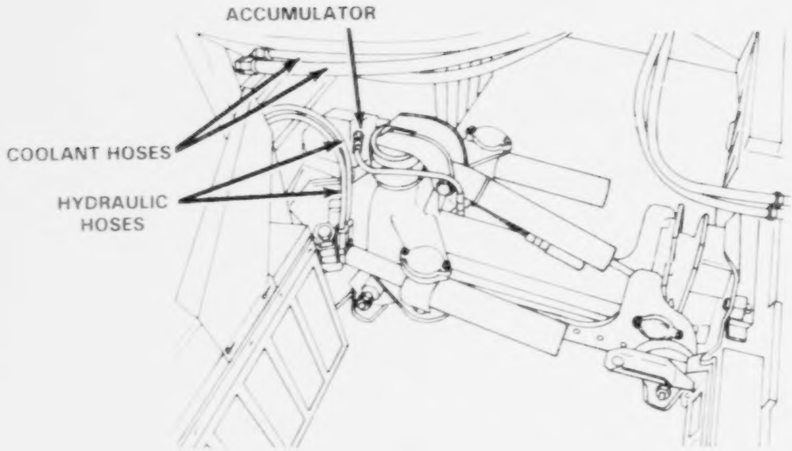
Keep personnel clear of steering unit when separating or connecting cars. Falling steering unit could cause injury to personnel.

WARNING

Do not attempt to drive carrier. Transfer is not securely mounted at this point. Injury to personnel or damage to equipment could result.

Step 14. Put jack under steering unit. Remove jack stand.
Step 15. Move front car rearward. Connect steering unit to front car.
Step 16. Put on the four mounting nuts. Torque nuts to 325 lb. ft. (440 Nm).
Step 17. Connect propeller shaft from rear car differential to transfer.
Step 18. Using location tags, connect steering unit hydraulic hoses.
Step 19. Using location tags, connect coolant hoses.
Step 20. Connect electrical cable.
Step 21. Tighten fill plug and charge accumulator. Refer to LO 9-2350-272-12.
Step 22. Fill transfer to proper level. Refer to LO 9-2350-272-12.

TA259231

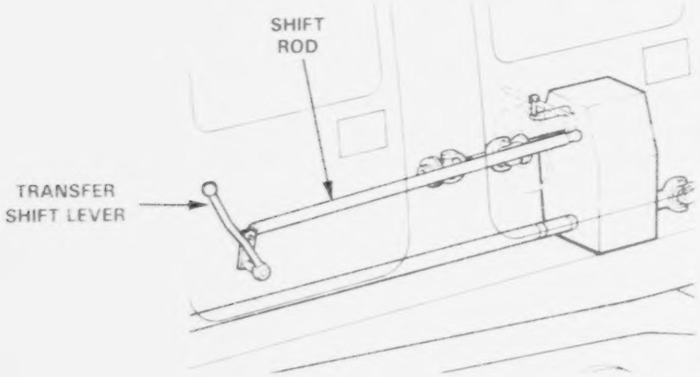

ACCUMULATOR
COOLANT HOSES
HYDRAULIC HOSES

Step 22. Start engine.
Step 23. Check for coolant and hydraulic oil leaks.
Step 24. Turn steering wheel all the way to the left, then all the way to the right to bleed steering system of air.
Step 25. Add coolant and hydraulic oil as necessary. Stop engine. Refer to LO 9-2350-272-12.

3-34. REMOVE, ADJUST AND REPLACE TRANSFER SHIFT ROD.

a. Remove.

Step 1. Remove engine hood.
Step 2. Shift transfer to neutral.
Step 3. Remove retaining pin in transfer end of shift rod.
Step 4. Disconnect shift rod.
Step 5. Move shift lever forward.
Step 6. Remove the end of the shift rod where the retaining pin is located.
Step 7. Remove shift rod.


SHIFT ROD
TRANSFER SHIFT LEVER

TA259232

b. Adjust shift rod.

Step 1. Loosen lock nut on both ends of shift rod.

NOTE

Screw ball sockets in to decrease length. Screw ball sockets out to increase length.

Step 2. Adjust shift rod to 53.7 to 54.3 in. (1366- 1370 mm).

c. Replace.

Step 1. Put shift rod in place.
Step 2. Connect ball socket of shift rod to ball of shift lever, put in retaining pin.
Step 3. Connect ball socket of shift rod to ball of shifting arm of transfer. Put in retaining pin.
Step 4. Start engine. Check operation.
Step 5. Replace engine hood.

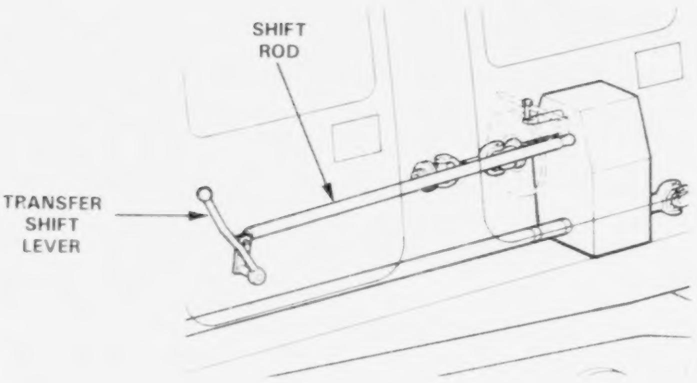
3-35. REMOVE AND REPLACE TRANSFER SHIFT LEVER.

a. Remove.

Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Remove retaining clip in shifting rod. Disconnect rod.
Step 3. Loosen screw in gear shift lever clevis.
Step 4. Pull off transfer shift lever. Remove woodruff key.
Step 5. Remove shift lever shaft.
Step 6. Using puller pull out the outer bushings.
Step 7. Press out inner bushings.

b. Replace.

Step 1. Put bushing in place.
Step 2. Put shift lever shaft in place.
Step 3. Put in woodruff key.
Step 4. Put transfer shift lever in place.
Step 5. Tighten clevis screw.
Step 6. Put transfer shift rod in place. Put in retaining clip.
Step 7. Replace power pack. Refer to paragraph 3-2.
Step 8. Check operation.



3-36. REMOVE AND REPLACE FRONT CAR DIFFERENTIAL.

a. Remove.

Step 1. Remove lockwire and screws on track body mounts.
Step 2. Raise front of body 2 inches off front car mounts.
Step 3. Place cribbing between body and chassis beam.
Step 4. Disconnect propeller shafts at differential.
Step 5. Disconnect air vent hose from differential.
Step 6. Place jack under differential. Raise jack to support differential.
Step 7. Remove differential mounting nuts.
Step 8. Remove winch support.
Step 9. Remove differential.

b. Replace.

Step 1. Transfer differential mount from unserviceable to serviceable differential. Torque bolts to 325 lb. ft. (440 Nm).

NOTE

Make sure that mating surfaces of chassis beam and differential are clean. Put a new preformed packing on differential. Make sure splined coupling enters differential drive flange.

Step 2. Using a jack, put differential in place on chassis beam.
Step 3. Put winch support in place.
Step 4. Put on four mounting nuts. Torque nuts to 325 lb. ft. (440 Nm). Remove jack.
Step 5. Connect air vent hose to differential.

TA259233

NOTE

Make sure mating surfaces of propeller shaft and differential are clean and match up perfectly.

Step 6. Connect differential to drive sprocket propeller shafts. Torque screw to 96 lb. ft. (130 Nm).

Step 7. Raise car body and remove cribbing.

Step 8. Lower body to car mounts.

Step 9. Put in mounting screws. Torque screws to 66 lb. ft. (90 Nm).

Step 10. Secure mounting screws and nuts with wire.

Step 11. Fill differential with proper lubricant. Refer to LO 9-2350-272-12.

Step 12. Check operation.

3-37. REMOVE AND REPLACE REAR CAR DIFFERENTIAL.

a. Remove.

Step 1. Apply parking brake.

Step 2. Disconnect transfer-to-rear car differential propeller shaft at the differential.

Step 3. Disconnect electrical cable between cars.

Step 4. Tag, disconnect and plug coolant hoses between cars.

Step 5. Remove splash guards.

Step 6. Put jack under steering unit. Raise jack to support weight of steering unit.

WARNING

Keep personnel clear of carrier's steering unit when separating or connecting cars. Falling steering unit could cause injury to personnel.

WARNING

Do not attempt to drive carrier with steering unit mounting nuts removed. Injury to personnel or damage to equipment may result.

Step 7. Remove steering unit differential mounting nuts from rear car.

Step 8. Push away rear car. Place chock in front and rear of tracks on rear car.

Step 9. Place jack stand under steering unit.

Step 10. Disconnect differential to drive sprocket propeller shaft at the differential.

Step 11. Remove lockwire and screws from front of rear car body mounts.

Step 12. Raise body 2 in. and place cribbing between body and chassis beam.

Step 13. Disconnect air vent hose from differential.

Step 14. Place jack under differential. Raise jack, support differential.

Step 15. Pull differential forward. Remove differential from jack.

b. Replace.

Step 1. Transfer differential mounts from unserviceable to serviceable differential. Torque bolts to 325 lb. ft. (440 Nm).

NOTE

Make sure that all mating surfaces of chassis beam and differential are clean.

Step 2. Using a jack, put differential in place on chassis beam. Remove jack.
Step 3. Connect air vent hose to differential.
Step 4. Raise body. Remove cribbing. Lower body. Make sure differential is seated correctly on chassis beam.

WARNING

Keep personnel clear of carrier steering unit when sperating or connecting cars. Falling steering unit could cause injury to personnel.

WARNING

Do not attempt to drive carrier with steering unit mounting nuts removed. Injury to personnel or damage to equipment may result.

Step 5. Lower body. Put in mounting screws. Torque screws to 66 lb. ft. (90 Nm). Secure with wire.
Step 6. Connect propeller shafts. Torque screws to 96 lb. ft. (130 Nm).

NOTE

Make sure mating surfaces of propeller shafts and differential are clean and match up perfectly.

Step 7. Remove jack stand from under steering unit.
Step 8. Remove chock block from tracks.
Step 9. Push rear car forward. Connect to steering unit.
Step 10. Screw on mounting nuts. Torque nuts to 325 lb. ft. (440 Nm). Remove jack.
Step 11. Connect electrical cable between cars.
Step 12. Using location tags unplug and connect coolant hoses.
Step 13. Add coolant and bleed cooling system. Refer to praragraph 3-23.
Step 14. Start engine and check operation. Check for leaks.
Step 15. Replace splash guards.
Step 16. Check differential oil level. Refer to LO 9-2350-272-12.

3-38. REMOVE AND REPLACE ENGINE-TO-HYDRAULIC PUMP PROPELLER SHAFT.

a. Remove.

Step 1. Remove right side engine access cover.
Step 2. Disconnect air induction hose from inlet side.
Step 3. Mark spline coupling on propeller shaft.
Step 4. Remove mounting screws on both ends of propeller shaft.
Step 5. Push splined coupling together. Remove propeller shaft.

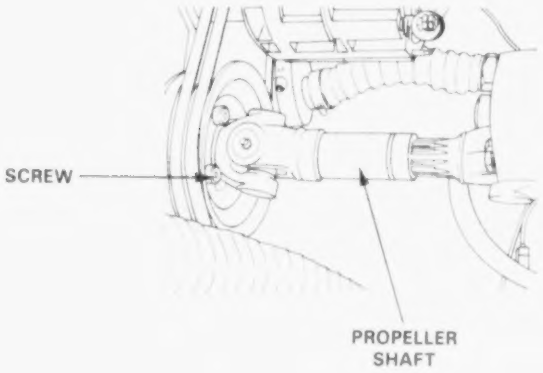
b. Replace.

Step 1. Clean contact surfaces of propeller shaft.
Step 2. Put a light coat of grease on splined coupling.

NOTE

Make sure spline coupling marks are aligned.

Step 3. Put propeller shaft in place.
Step 4. Put in screws. Tighten screws.
Step 5. Lubricate universal joints. Refer to LO 9-2350-272-12.
Step 6. Connect air induction hose.
Step 7. Replace right side access cover.



3-39. REMOVE AND REPLACE TRANSMISSION-TO-TRANSFER PROPELLER SHAFT.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Mark spline coupling on propeller shaft.

NOTE

For easy access to mounting screws. place transfer in neutral to rotate propeller shaft. For removal of the mounting screws place transfer in gear to stop rotation of propeller shaft.

Step 3. Remove screws in transmission end of propeller shaft.
Step 4. Loosen screw in flange coupling on transfer end of propeller shaft.
Step 5. Pull propeller shaft from transmission about 3/4 in. (20 mm), and lift it.
Step 6. Remove propeller shaft.

TA259777

b. Replace.

Step 1. Clean contact surfaces of propeller shaft.
Step 2. Put light coat of grease on splined coupling.

NOTE

Check to see that spacer on transfer shaft is in place.
Make sure splined coupling marks are aligned.

Step 3. Align arrows on propeller shaft and connect propeller shaft to transfer. Tighten screw.
Step 4. Connect propeller shaft to transmission.
Step 5. Put in screws and nuts. Torque nuts to 37 lb. ft. (50 Nm).
Step 6. Lubricate the universal joints. Refer to LO 9-2350-272-12.
Step 7. Replace engine cover and hood.

3-40. REMOVE AND REPLACE TRANSFER-TO-REAR CAR DIFFERENTIAL PROPELLER SHAFT.

a. Remove.

Step 1. Mark propeller shaft at spline coupling.
Step 2. Remove screws from differential end of propeller shaft.
Step 3. Lower propeller shaft and pull flange coupling apart.
Step 4. Loosen clamp screw.
Step 5. Pull off flange with universal joint.
Step 6. Remove flange from universal joint.

b. Replace.

Step 1. Put light coat of grease on splined coupling.
Step 2. Put flange on output shaft of transfer.
Step 3. Torque clamp screw to 44 lb. ft. (60 Nm).

NOTE

Make sure marks on propeller shaft and flange coupling are aligned.

Step 4. Put propeller shaft in flange.

NOTE

When necessary raise one side of car. Move track forward or rearward to align holes in flanges.

Step 5. Put propeller shaft in place at rear car differential. Put in and torque screws to 36 lb. ft. (49 Nm).
Step 6. Lubricate universal joint. Refer to LO 9-2350-272-12.

3-41. REMOVE AND REPLACE TRANSFER-TO-FRONT CAR DIFFERENTIAL PROPELLER SHAFT (INSIDE CHASSIS BEAM).

a. Remove.

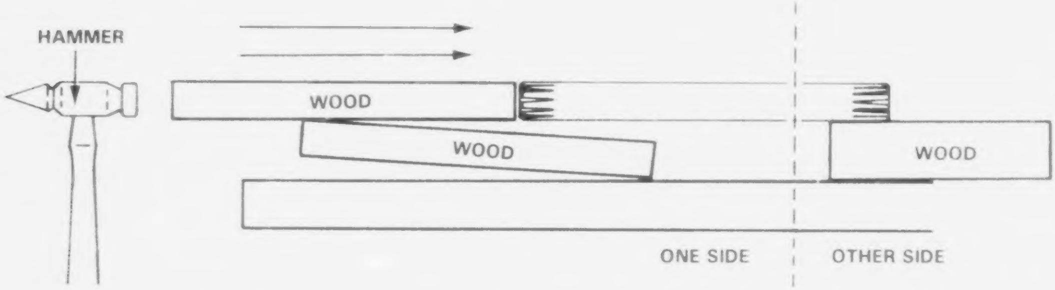
Step 1. Remove front differential. Refer to paragraph 3-36.
Step 2. Remove transfer. Refer to paragraph 3-33.
Step 3. Knock out propeller shaft with support bearing using blocks of wood.

b. Replace.

NOTE

The shorter section of the shaft from the support bearing goes toward the rear of the car.

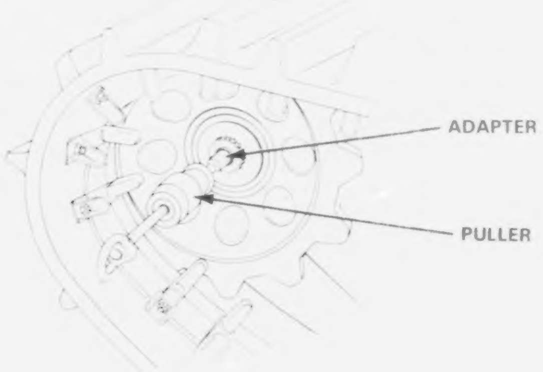
Step 1. Put propeller shaft in place.
Step 2. Replace transfer and differential.
Step 3. Lubricate universal joints. Refer to LO 9-2350-272-12.



3-42. REMOVE AND REPLACE DIFFERENTIAL-TO-DRIVE SPROCKET PROPELLER SHAFTS.

a. Remove.

Step 1. Remove screws mounting propeller shaft to differential. Disconnect propeller shaft.
Step 2. Remove screw and washer in center of sprocket.
Step 3. Screw puller into center of sprocket. See Table 2-1, item 22.



TA259234

Step 4. Pull outward until shaft comes loose.
Step 5. Tap shaft in approximately 0.394 in. (10 mm).
Step 6. Remove shaft.

b. Replace.

Step 1. Clean all mating surfaces.
Step 2. Put a light coat of grease on splined shaft.
Step 3. Put propeller shaft on splined shaft from sprocket bearing assembly.
Step 4. Put washer and center screw in sprocket. Do not tighten.

NOTE

Make sure flange fits correctly when screws are pulled tight.

Step 5. Put propeller shaft in place at differential. Torque screws to 96 lb. ft. (130 Nm).
Step 6. Torque sprocket center screw to 268 lb. ft. (350 Nm).
Step 7. Lubricate universal joints. Refer to LO 9-2350-272-12.

3-43. REMOVE AND REPLACE UNIVERSAL JOINTS.

a. Remove.

Step 1. Remove retaining clip.
Step 2. Press bearing approximately 5/8 in. (15 mm) outward.
Step 3. Clamp bearing cap in a vice.
Step 4. Tap out propeller shaft.
Step 5. Repeat Step 1 through Step 4 for the other three bearings.

b. Replace.

NOTE

Make sure needle bearings remain in place in bearing cap.

Step 1. Remove two opposite bearing caps from universal joint.
Step 2. Put universal joint in place.
Step 3. Press in bearing caps.
Step 4. Put retaining clips in place.
Step 5. Repeat step 1 through step 4 for the other two bearing caps.
Step 6. Lubricate universal joints. Refer to LO 9-2350-272-12

Section IV. ELECTRICAL SYSTEM MAINTENANCE INSTRUCTIONS

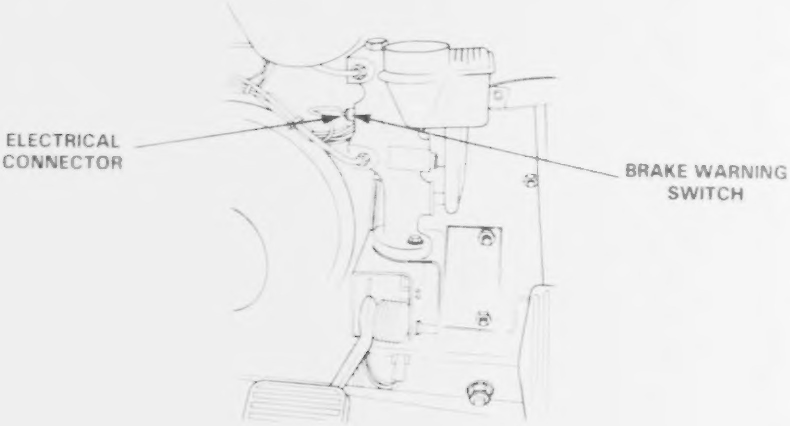
3-44. REMOVE AND REPLACE BRAKE WARNING SWITCH.

a. Remove.

Step 1. Unplug electrical connector.
Step 2. Unscrew warning switch from master cylinder.

b. Replace.

Step 1. Screw warning switch into master cylinder.
Step 2. Connect electrical connector.
Step 3. Test brake warning switch. Refer to paragraph 3-98.


ELECTRICAL CONNECTOR
BRAKE WARNING SWITCH

TA259235

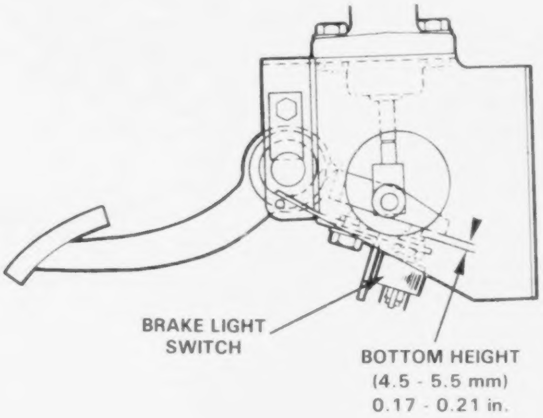
3-45. REMOVE AND REPLACE BRAKE LIGHT SWITCH.

a. Remove.

Step 1. Tag and disconnect electrical wires from brake light switch.
Step 2. Remove lock nut.
Step 3. Unscrew switch.

b. Replace.

Step 1. Screw brake light switch in to a bottom height of 0.17 to 0.21 in. (4.5 to 5.5 mm).
Step 2. Put on and tighten lock nut.
Step 3. Using location tags, connect electrical wires.
Step 4. Check operation of brake light.


BRAKE LIGHT SWITCH
BOTTOM HEIGHT
(4.5 - 5.5 mm)
0.17 - 0.21 in.

TA259236

3-46. REMOVE AND REPLACE ALTERNATOR.

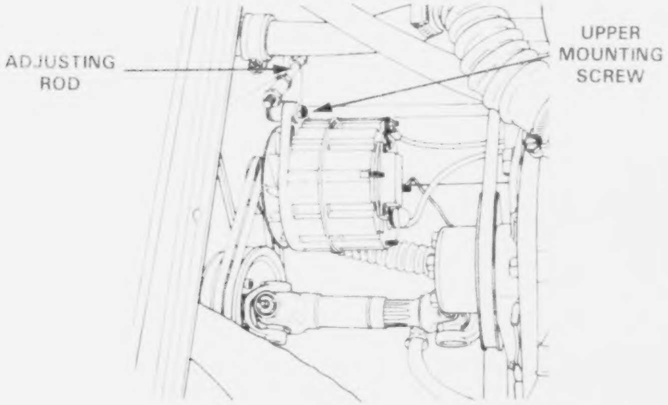
a. Remove.

CAUTION

Do not operate alternator on an open circuit. Battery cables, alternator and regulator connections must not be detached when the engine is running.

Do not try to polarize the alternator. Damage to equipment may result.

Step 1. Remove battery cover.
Step 2. Disconnect battery ground cable from battery.
Step 3. Remove engine right side access cover.
Step 4. Disconnect air induction hose from inlet end. Move hose aside.
Step 5. Loosen locknut lower end of adjusting rod assembly.
Step 6. Loosen upper adjusting nut until V-belts have no remaining tension.
Step 7. Remove screw from lower adjusting rod assembly.
Step 8. Remove alternator lower mounting screw. Move tensioning device aside.
Step 9. Remove V-belts from alternator pulley.
Step 10. Remove alternator.
Step 11. Tag and remove wires from alternator.
Step 12. Remove tensioning device.



TA259237

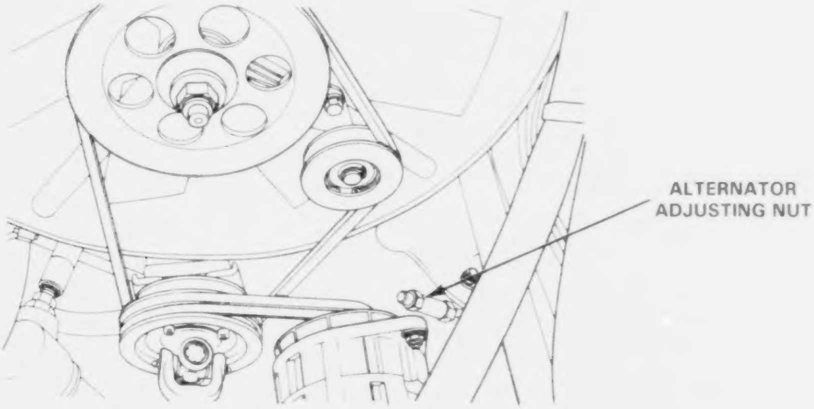
b. Replace.

Step 1. Put tensioning device in place on alternator.
Step 2 Using location tags, connect alternator wires.
Step 3. Put alternator in place.
Step 4. Put in lower alternator screw. Do not tighten.
Step 5. Put V-belts on alternator pulley.
Step 6. Put in upper alternator mounting screw. Do not tighten.

NOTE

Alternator V-belts must have ¼ in (5 mm) deflection.

Step 7. Tighten alternator adjusting nut.
Step 8. Tighten lower mounting screw adjusting rod assembly.
Step 9. Tighten alternator mounting screws.
Step 10. Recheck deflection of alternator drive belts.
Step 11. Connect air induction hose.
Step 12. Replace engine right side access cover.
Step 13. Reconnect battery ground cable.
Step 14. Replace battery cover.



3-47. REMOVE AND REPLACE STARTER.

a. Remove.

Step 1. Remove battery box cover.
Step 2. Disconnect battery ground cable.
Step 3. Remove engine hood and console.
Step 4. Tag and disconnect starter cables.
Step 5. Remove starter motor mounting screws.
Step 6. Remove starter.

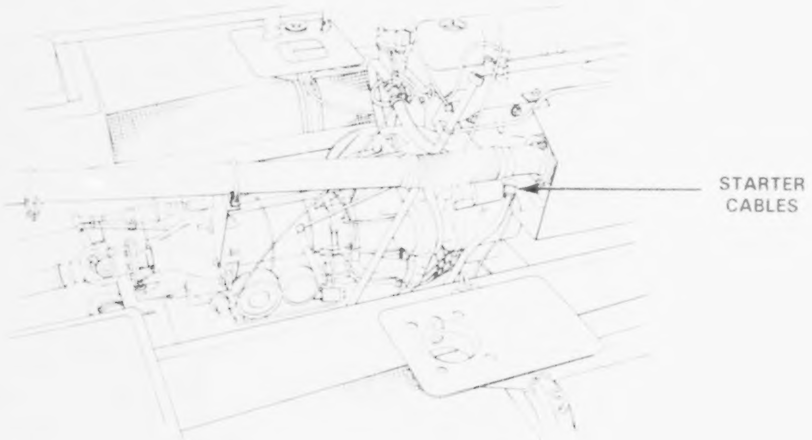
TA259238

CAUTION

Due to close area of starter connections and heat shield, caution must be taken not to ground starter wires to heat shield. Damage to equipment may result.

b. Replace.

Step 1. Put starter in place.
Step 2. Put in and tighten starter motor mounting screws.
Step 3. Using location tags, connect starter cables.
Step 4. Replace engine hood and console.
Step 5. Connect battery ground cable.
Step 6. Replace battery box cover.



3-48. REMOVE AND REPLACE HEADLIGHT LAMP.

a. Remove.

Step 1. Remove each headlight housing from inside vehicle.
Step 2. Remove connector.
Step 3. Remove rubber cap.
Step 4. Rotate clamp ring counter-clockwise.
Step 5. Remove lamp.

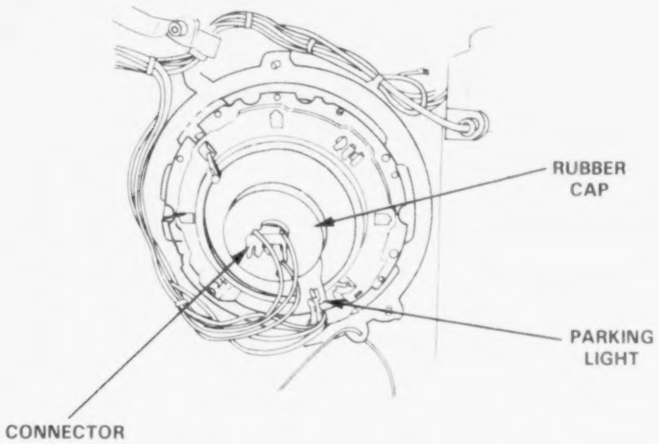
b. Replace.

CAUTION

Do not touch lamp with bare fingers. Make sure that lamp guides enter into holder slots.

TA259239

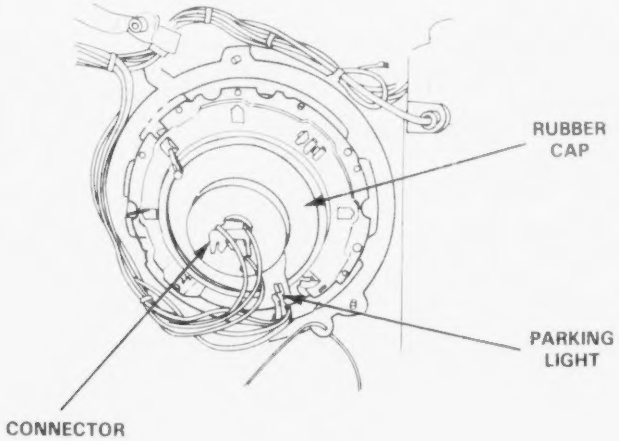
Step 1. Put lamp into headlight housing.
Step 2. Put on clamp ring and rotate clockwise.
Step 3. Put on rubber cap.
Step 4. Connect electrical connector to headlight lamp.
Step 5. Check operation of headlights.
Step 6. Replace rear headlight housing.


RUBBER CAP
PARKING LIGHT
CONNECTOR

3-49. REMOVE AND REPLACE HEADLIGHT UNIT.

a. Remove.

Step 1. Remove rear headlight housing from inside vehicle.
Step 2. Remove connector and rubber cap.
Step 3. Rotate clamp ring counter-clockwise and remove lamp.
Step 4. Remove parking lamp assembly.
Step 5. Remove four screws holding headlight unit to car body.
Step 6. Remove headlight unit.


RUBBER CAP
PARKING LIGHT
CONNECTOR

TA259240

b. Replace.

Step 1. Put headlight unit in place

Step 2. Put in and tighten four headlight unit mounting screws.

CAUTION

Do not touch lamp with bare fingers. Make sure that lamp guides enter into holder slots.

Step 3. Put lamp into headlight housing.

Step 4. Put on clamp ring and rotate clockwise

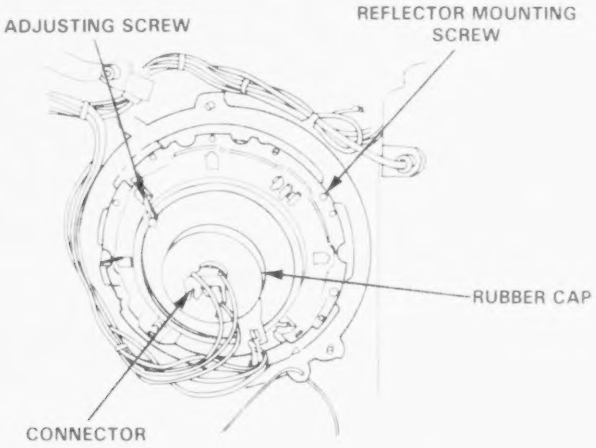
Step 5. Put on rubber cap.

Step 6. Connect electrical connector to lamp.

Step 7. Put parking lamp assembly in place.

Step 8. Check operation of lights.

Step 9. Replace rear headlight housing.

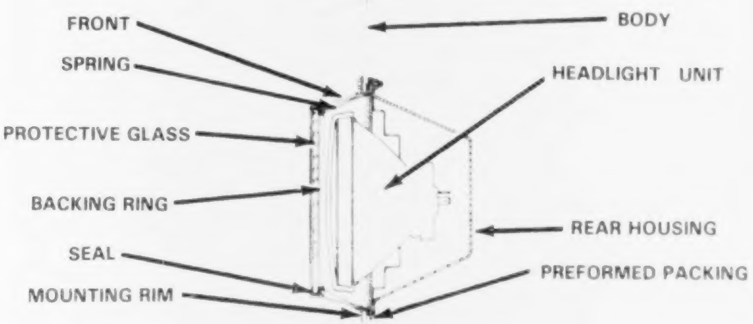

ADJUSTING SCREW
REFLECTOR MOUNTING SCREW
RUBBER CAP
CONNECTOR

TA259241

3-50. REMOVE AND REPLACE HEADLIGHT PROTECTIVE GLASS.

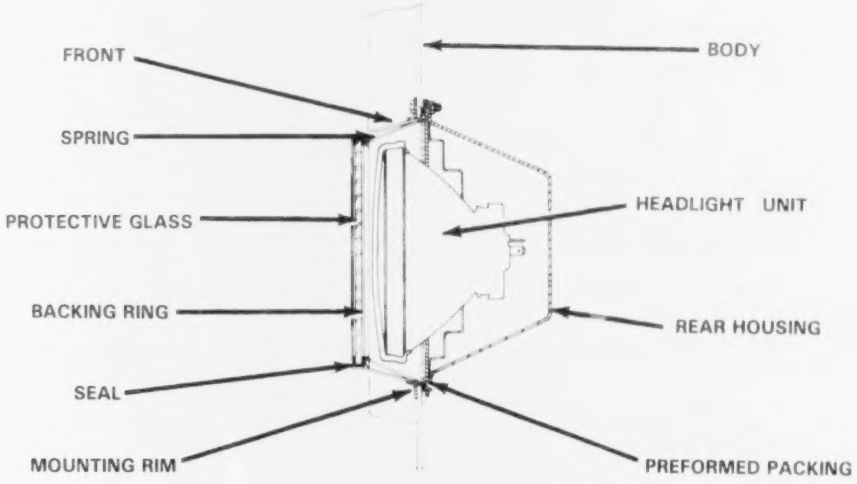
a. Remove.

Step 1. Remove headlight housing from inside vehicle.
Step 2. Remove four screws holding headlight unit to car body.
Step 3. Remove headlight unit.
Step 4. Remove six springs and backing ring holding protective glass.
Step 5. Remove protective glass and packing.


FRONT
BODY
SPRING
HEADLIGHT UNIT
PROTECTIVE GLASS
BACKING RING
REAR HOUSING
SEAL
PREFORMED PACKING
MOUNTING RIM

b. Replace.

Step 1. Put new packing on protective glass.
Step 2. Put protective glass and backing ring in place.
Step 3. Put backing ring and protective glass in place. Put in six springs
Step 4. Put head light unit in place.
Step 5. Put in and tighten four mounting screws.
Step 6. Replace headlight housing.
Step 7. Check operation of lights.


FRONT
BODY
SPRING
HEADLIGHT UNIT
PROTECTIVE GLASS
BACKING RING
REAR HOUSING
SEAL
MOUNTING RIM
PREFORMED PACKING

TA259242

3-51. ADJUST HEADLIGHTS.

NOTE

To insure that headlight adjustment is done properly, it is important that the vehicle be aligned correctly. When possible, adjust headlights with the vehicle in shop bay nearest to a corner in the building. Read Steps 1 through 3, then start.

Step 1. Place two marks on the floor 16.4 feet (5 meters) from the wall in front of the shop bay. Draw a 10 foot line (x) through the marks.

Step 2. Start engine.

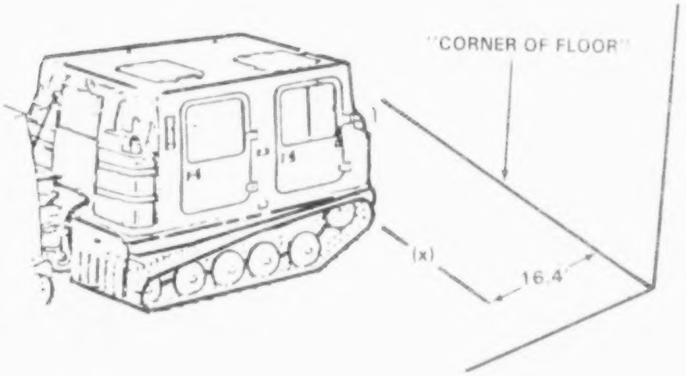
Step 3. Measure the distance from each headlight to the wall.

NOTE

The distance measured for each headlight must be 16.4 feet (5 meters). If the distance measured for both headlights is 16.4 feet (5 meters), go to Step 7. If the distance is not the same for both headlights, do Steps 4 and 5.

Step 4. Adjust the position of the vehicle until the measured distance (16.4 feet) for both headlights is the same.

Step 5. Apply parking brake. Stop engine.



Step 6. Measure the distance from the floor to the center of the headlight. Mark the distance measured in two places on the wall in front of the vehicle.

Step 7. Draw a line parallel to the floor through the marks on the wall. Label this line (a).

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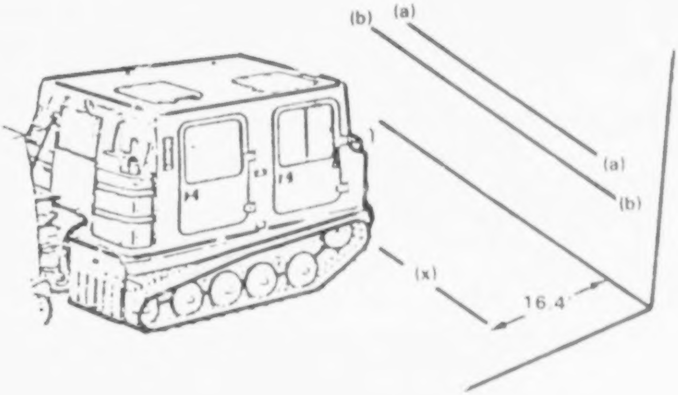
Step 8. Measure down from line (a) 2 inches (5 cm). Draw a second line parallel to the first line. Label this line (b).

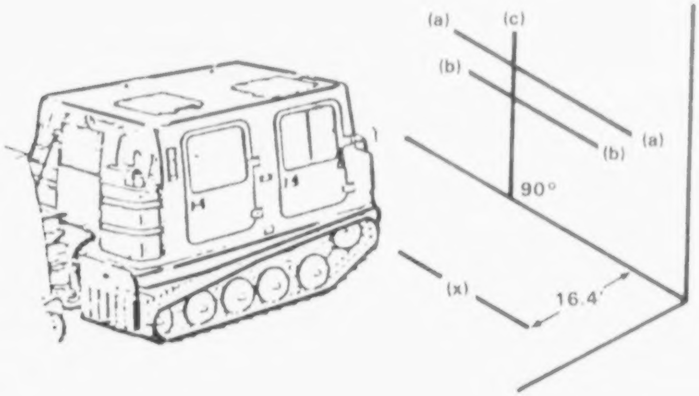


Step 9. Measure the width of the front bumper. Divide the width by 2.

Step 10. Use the figure you got when dividing the width of the front bumper. Measure from one end of the bumper and mark the center of the bumper.

Step 11. Measure from the center of the bumper to the nearest wall on the left or right side of vehicle.

Step 12. Mark the distance measured in Step 11 above line (a) and below line (b). Draw a vertical line through the two marks. Label this line (c).



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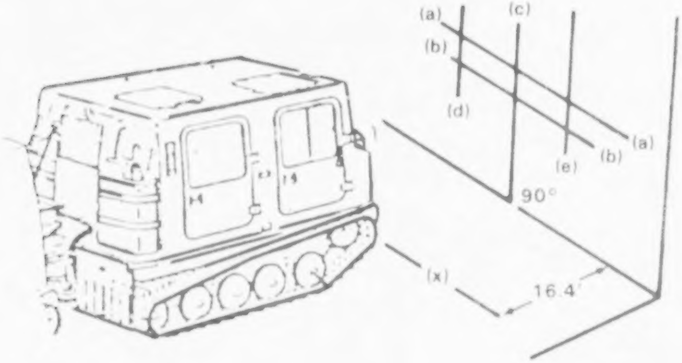
Step 13. Measure the distance from the center of the bumper to the center of the left headlight.

Step 14. Place the beginning of the tape measure on line (c). Mark the distance measured in step 13 to the left of line (c) above line (a) and below line (b). Draw a vertical line through the two marks. Label this line (d).

Step 15. Measure the distance from the center of the bumper to the right headlight.

Step 16. Place the beginning of the tape measure on line (c). Mark the distance measured in Step 17 to the right of line (c) above line (a) and below the (b). Draw a vertical line through the two marks. Label this line (e).



TA259245

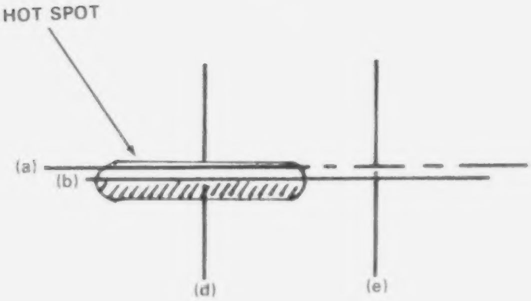
Step 17. Turn on headlights. Switch headlights to high beam.

Step 18. Cover right headlight.

Step 19. Check headlight hotspot. Center of hotspot must be where lines (a) and (d) meet.

NOTE

If center of headlight hotspot does not aline correctly, do Step 20.



Step 20. Turn adjusting screws to move headlight hotspot up and down and right and left.

Step 21. Repeat steps 19 and 20 again for right headlight, covering left headlight and using line (a) and (e).

Step 22. Turn off headlights.

TA259246

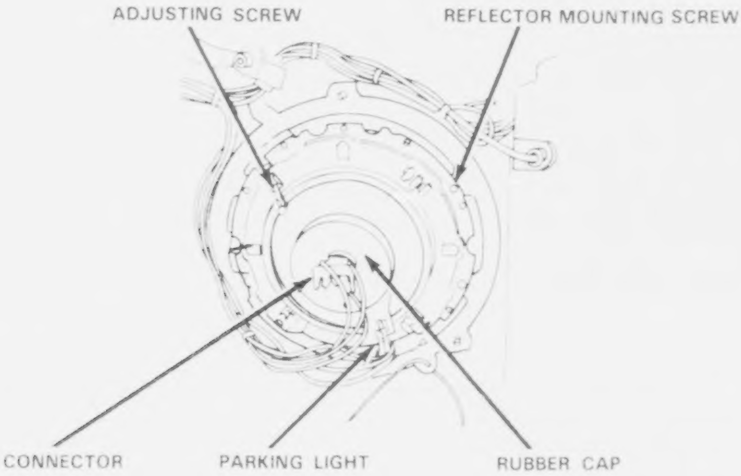
3-52. REMOVE AND REPLACE PARKING LIGHT BULB.

a. Remove.

Step 1. Remove headlight rear housing from inside vehicle.
Step 2. Remove parking light assembly.
Step 3. Remove lamp from socket.

b. Replace.

Step 1. Put lamp in socket.
Step 2. Put parking light assembly in place.
Step 3. Replace headlight housing.


ADJUSTING SCREW
REFLECTOR MOUNTING SCREW
CONNECTOR
PARKING LIGHT
RUBBER CAP

3-53. REMOVE AND REPLACE TURN SIGNAL AND SIDE MARKER ASSEMBLY.

a. Remove.

Step 1. Remove lens.
Step 2. Remove lamp.
Step 3. Remove two mounting screws.
Step 4. Tag and remove electrical wires.
Step 5. Remove light assembly.

b. Replace.

Step 1. Using location tags, connect electrical wires.
Step 2. Put light fixture in place.
Step 3. Put in and tighten two mounting screws.
Step 4. Put lamp in place.

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Step 5. Check operation of light.

NOTE

Drain hole must face down.

Step 6. Put lens in place.
Step 7. Put in and tighten screws.

3-54. REMOVE AND REPLACE TURN SIGNAL, SIDE MARKER, COMBINATION BACK-UP LIGHT AND CABIN LAMP.

a. Remove.

Step 1. Remove lens screws and plastic lens.
Step 2. Remove lamp.

b. Replace.

Step 1. Put lamp in place.
Step 2. Check operation of light.
Step 3. Put lens in place.
Step 4. Put in and tighten screws.

3-55. REMOVE AND REPLACE MAP READING LIGHT FIXTURE.

a. Remove.

Step 1. Remove screws and nuts.
Step 2. Tag and disconnect electrical wires.
Step 3. Remove light fixture.

b. Replace.

Step 1. Using location tags connect wires to light fixture.
Step 2. Put light fixture in place. Put in and tighten screws.
Step 3. Check operation of light.

3-56. REMOVE AND REPLACE CABIN LIGHT FIXTURE.

a. Remove.

Step 1. Remove screws.
Step 2. Tag and remove electrical wires.
Step 3. Remove cabin light fixture.

b. Replace.

- **Step 1.** Using location tags, connect two electrical wires.
- **Step 2.** Put light fixture in place. Put in and tighten screws.
- **Step 3.** Check operation of light.

3-57. REMOVE AND REPLACE GEAR SELECTOR LIGHT FIXTURE.

a. Remove.

- **Step 1.** Remove four screws from cover plate.
- **Step 2.** Remove left side access cover.
- **Step 3.** Remove clamp holding electrical wires together.
- **Step 4.** Remove bulb.
- **Step 5.** Disconnect contact pin from wire.
- **Step 6.** Remove light fixture.

b. Replace.

- **Step 1.** Put spring and insulating washer on wire.
- **Step 2.** Put contact pin on wire.
- **Step 3.** Put on and secure clamp on wire.
- **Step 4.** Put bulb in socket.
- **Step 5.** Check operation of light.
- **Step 6.** Put light fixture in place.
- **Step 7.** Put in and tighten four screws in cover plate.
- **Step 8.** Replace access cover.

3-58. REMOVE AND REPLACE DIRECTIONAL INDICATOR SWITCH.

a. Remove.

- **Step 1.** Remove screws holding switch on steering column.
- **Step 2.** Disconnect connector P12 under instrument panel.
- **Step 3.** Remove switch and connector.

b. Replace.

- **Step 1.** Connect electrical connector P12.
- **Step 2.** Put switch in place.
- **Step 3.** Put in and tighten screws holding switch on steering column.

3-59. REMOVE AND REPLACE HORN.

a. Remove.

Step 1. Open front air intake grille.
Step 2. Disconnect electrical wires.
Step 3. Remove mounting screws.
Step 4. Remove horn.

b. Replace.

Step 1. Put horn in place.
Step 2. Put in and tighten mounting screws.
Step 3. Connect electrical wires.
Step 4. Check operation of horn.
Step 5. Close front air intake grille.

3-60. REMOVE AND REPLACE WINDSHIELD WIPER MOTOR.

a. Remove.

Step 1. Remove cap, nut, washer and windshield wiper arm.
Step 2. Tag and remove electrical wire from windshield wiper motor.
Step 3. Remove cap, nut and washers holding motor.
Step 4. Remove motor.

b. Replace.

Step 1. Put windshield wiper motor in place.
Step 2. Put on washer. Put on and tighten nut.
Step 3. Using location tags, connect electrical wires.
Step 4. Put on windshield wiper arm. Put on washer and nut. Tighten nut. Put on cap.
Step 5. Check operation.

3-61. REMOVE AND REPLACE MAIN SWITCH RELAY.

a. Remove.

Step 1. Remove drivers seat. Refer to 3-133.
Step 2. Remove battery box cover.
Step 3. Disconnect battery ground cable.
Step 4. Remove two screws. Remove electrical connector box cover.
Step 5. Tag and disconnect electrical cable assembly.
Step 6. Remove screws and nuts. Remove main switch relay.

b. Replace.

Step 1. Put main switch relay in place.
Step 2. Using location tags, connect elecrical cable assembly.
Step 3. Put on electrical connector box cover.
Step 4. Replace driver seat. Refer to paragraph 3-133.
Step 5. Reconnect battery ground cable.
Step 6. Put on and secure battery box cover.

3-62. REMOVE AND REPLACE BLACKOUT LIGHT SELECTOR SWITCH.

a. Remove.

Step 1. Remove battery box cover and disconnect ground cable.
Step 2. Remove control panel. Refer to paragraph 3-63.
Step 3. Tag and disconnect electrical wires from switch.
Step 4. Press in on back of switch.
Step 5. Pry lockring from front of switch.
Step 6. Remove switch from panel.

b. Replace.

Step 1. Position switch in panel.
Step 2. Press lockring into position on front of switch.
Step 3. Connect electrical wires to switch. Remove tags.
Step 4. Replace control panel. Refer to paragraph 3-63.
Step 5. Connect battery ground cable. Put on battery box cover.

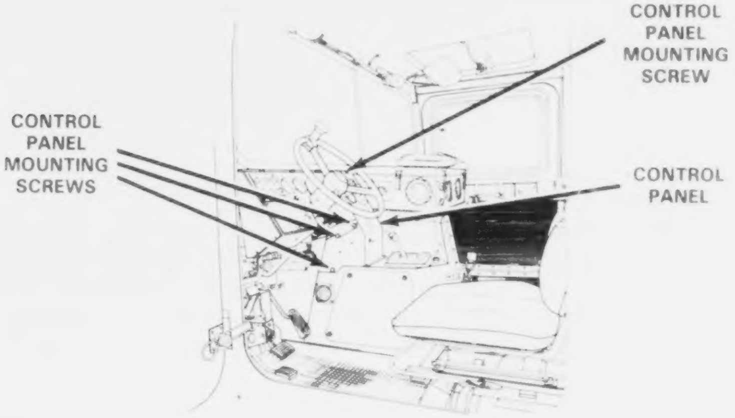
3-63. REMOVE AND REPLACE CONTROL PANEL.

a. Remove.

Step 1. Remove battery box cover.
Step 2. Remove battery ground cable.
Step 3. Remove four screws holding control panel.
Step 4. Cut wire ties.
Step 5. Lift panel and disconnect electrical connectors P8, P11, and P24.
Step 6. Remove control panel.

b. Replace.

Step 1. Put control panel in place.
Step 2. Connect electrical connectors P8, P11 and P24..
Step 3. Put on and secure wire ties.
Step 4. Put in and tighten four mounting screws.
Step 5. Replace battery ground cable.
Step 6. Replace battery box cover.



3-64. REMOVE AND REPLACE RHEOSTAT, INSTRUMENT LIGHTS, IGNITION SWITCH, GLOW PLUG SWITCH, HEAD LIGHT SWITCH, CIRCULATION PUMP SWITCH, TURN SIGNAL RELAY, TERMINAL BLOCK, WINDSHIELD WIPER RELAY K3 AND INDICATOR LIGHTS.

a. Remove.

Step 1. Remove battery box cover and disconnect ground cable.
Step 2. Remove control panel. Refer to paragraph 3-63.
Step 3. Locate defective component.
Step 4. Tag and remove electrical wires.
Step 5. Remove defective component.

TA259248

b. Replace.

Step 1. Put in and secure serviceable component.
Step 2. Using location tags, connect electrical wires.
Step 3. Replace control panel. Refer to paragraph 3-63.
Step 4. Connect battery ground cable. Put on battery box cover.

3-65. REMOVE AND REPLACE INSTRUMENT PANEL.

a. Remove.

Step 1. Loosen but do not remove two screws holding directional indicator level. Turn assembly downward.
Step 2. Remove steering wheel.
Step 3. Remove four screws holding instrument panel.
Step 4. Remove instrument panel.
Step 5. Remove clamp holding harness.
Step 6. Disconnect connectors P9, P20, P21, P29, and P57.

b. Replace.

Step 1. Reconnect electrical connectors P9, P20, P21, P29, and P57.
Step 2. Put on and fasten clamp holding harness.
Step 3. Put in and tighten four instrument panel screws and lock nut.
Step 4. Put on and secure steering wheel.
Step 5. Turn directional indicator lever back to mounting position and tighten mounting screws.

3-66. REMOVE AND REPLACE SPEEDOMETER, FUEL GAGE, COOLANT TEMPERATURE GAGE, TACHOMETER PANEL LIGHTS AND INDICATOR LIGHTS.

a. Remove.

Step 1. Remove instrument panel. Refer to paragraph 3-65.
Step 2. Locate defective component.
Step 3. Tag and disconnect electrical wires.
Step 4. Remove defective components.

b. Replace.

Step 1. Put in and secure serviceable component.
Step 2. Using location tags, connect electrical wires.
Step 3. Replace instrument panel. Refer to paragraph 3-65.

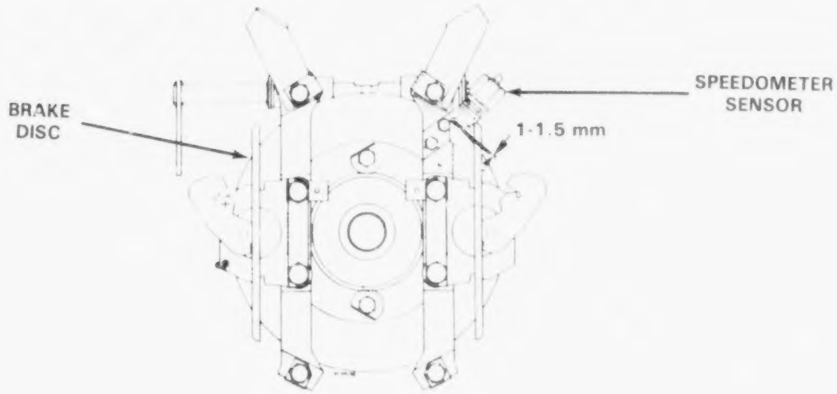
3-67. REMOVE AND REPLACE SPEEDOMETER SENSOR.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Tag and remove electrical wires at sensor.
Step 3. Remove sensor.

b. Replace.

Step 1. Screw sensor in until it bottoms on brake disc.
Step 2. Unscrew sensor ¾ to 1 turn.
Step 3. Measure clearance between brake disc and sensor.
Step 4. Adjust sensor to.039 to .059 in. (1 to 1.5 mm).
Step 5. Tight lock nut on sensor.
Step 6. Using location tags connect electrical wires.
Step 7. Replace engine cover and hood.



3-68. REMOVE AND REPLACE TEMPERATURE SENSOR.

a. Remove.

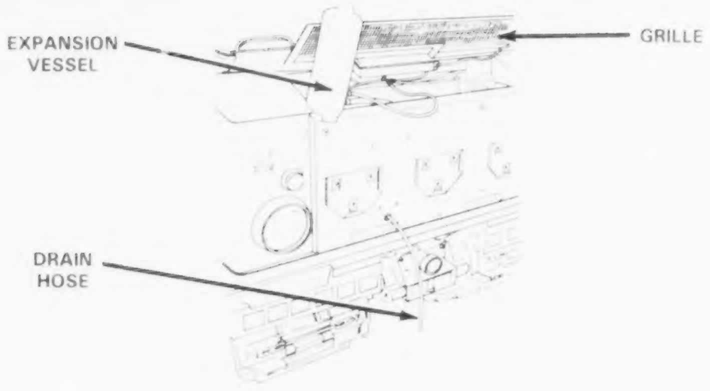
Step 1. Open front grille.
Step 2. Remove plug from drain hose in front of car.
Step 3. Pull drain hose out.
Step 4. Remove elastic band from around expansion vessel.
Step 5. Lift expansion vessel and support it on front of car.

WARNING

Let engine cool completely. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant may result.

Step 6. Remove expansion vessel cap.

TA259249



Step 7. Open radiator drain valve. Drain radiator.
Step 8. Close radiator drain valve.
Step 9. Remove engine hood.
Step 10. Disconnect electrical connector from temperature sensor on left front side of engine head.
Step 11. Unscrew and remove temperature sensor and seal.

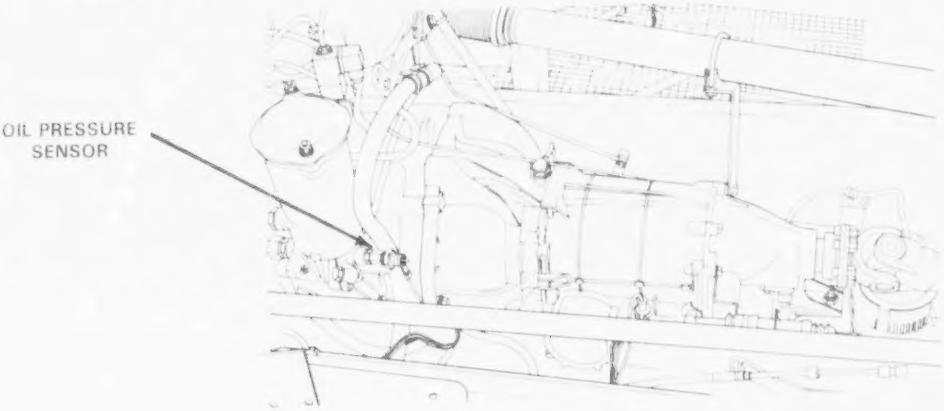
b. Replace.

Step 1. Put new seal on temperature sensor.
Step 2. Screw in and tighten temperature sensor.
Step 3. Connect electrical connector.
Step 4. Fill and bleed cooling system. Refer to paragraph 3-23.
Step 5. Replace engine hood.

3-69. REMOVE AND REPLACE ENGINE OIL SENSOR.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Disconnect electrical connector from oil sensor.
Step 3. Unscrew and remove oil sensor.



TA259250

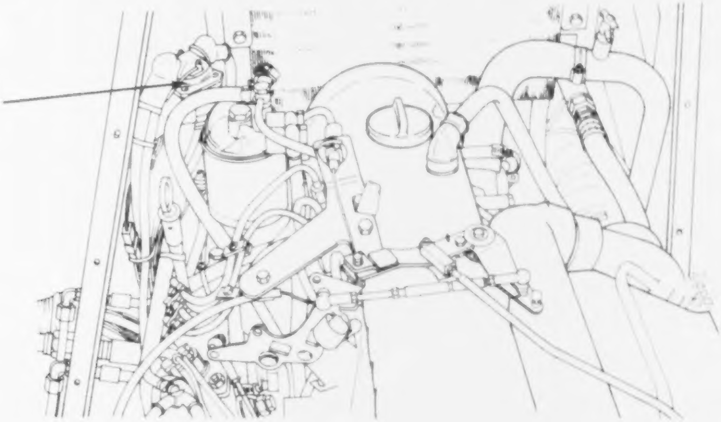
b. Replace.

Step 1. Screw in and tighten oil sensor.
Step 2. Connect electrical connector.
Step 3. Operate engine and check for leaks.
Step 4. Replace engine cover and hood.

3-70. REMOVE AND REPLACE PREHEATER RELAY.

a. Remove.

Step 1. Remove engine hood and battery box cover.
Step 2. Disconnect battery negative (-) cable.
Step 3. Tag and disconnect electrical wires from relay.
Step 4. Remove two nuts and washers. Remove preheater relay.



b. Replace.

Step 1. Put preheater relay in place. Put on washers and nuts. Tighten nuts.
Step 2. Using location tags connect electrical wires.
Step 3. Connect battery negative (-) cable. Replace battery box cover.
Step 4. Replace engine hood.

3-71. REMOVE AND REPLACE BILGE PUMP (FRONT CAR)

a. Remove.

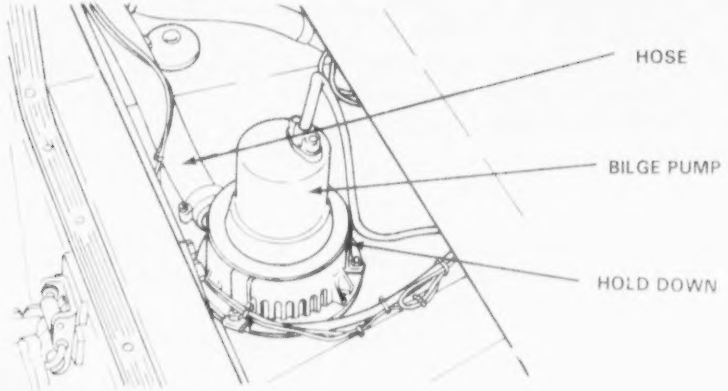
Step 1. Remove engine cover
Step 2. Disconnect electrical connector and wire tie.
Step 3. Remove hold down and nuts.
Step 4. Remove wire clamp from chassis.
Step 5. Remove pump.
Step 6. Remove hose and clamp from pump.

b. Replace.

Step 1. Replace hose and clamp to pump.

TA259259

Step 2. Replace pump.
Step 3. Replace hold down and nuts.
Step 4. Replace wire clamp to chassis.
Step 5. Connect electrical connector and wire tie.
Step 6. Replace engine cover.



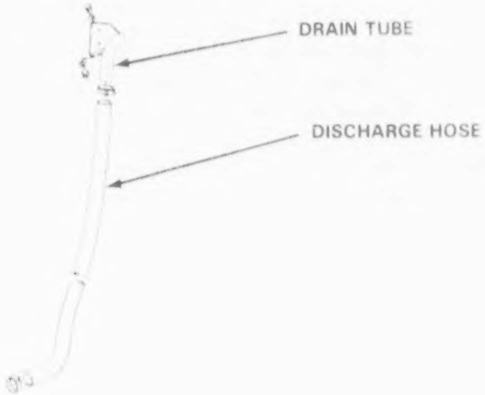
3-72. REMOVE AND REPLACE BILGE PUMP DISCHARGE HOSE.

a. Remove.

Step 1. Remove engine cover.
Step 2. Disconnect hose from bilge pump.
Step 3. Open rear grille.
Step 4. Remove nuts, washer and screws from drain tube.
Step 5. Remove drain tube.
Step 6. Remove hose.

b. Replace.

Step 1. Connect drain tube to discharge hose.
Step 2. Put discharge hose in place.
Step 3. Put screws, washers and nut on drain tube. Tighten nuts.
Step 4. Close rear grille.
Step 5. Connect discharge hose to bilge pump.
Step 6. Replace engine cover.



TA259251

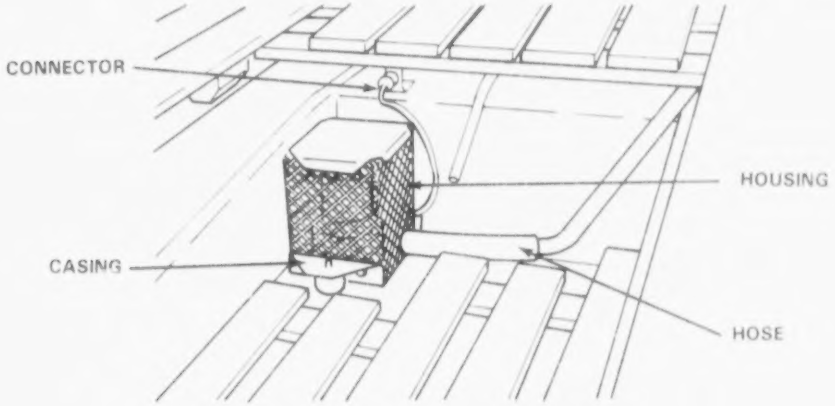
3-73. REMOVE AND REPLACE BILGE PUMP (REAR CAR).

a. Remove.

Step 1. Disconnect electrical connector.
Step 2. Remove bilge pump with housing casing, and hose.
Step 3. Cut wire tie.
Step 4. Remove housing.
Step 5. Remove pump from casing.
Step 6. Remove hose from bilge pump.

b. Replace.

Step 1. Put on and secure hose to bilge pump.
Step 2. Put bilge pump in casing.
Step 3. Replace housing and secure wire with wire tie.
Step 4. Put bilge pump with casing and housing in place.
Step 5. Connect electrical connector.



3-74. REMOVE AND REPLACE COOLANT CIRCULATION PUMP.

a. Remove.

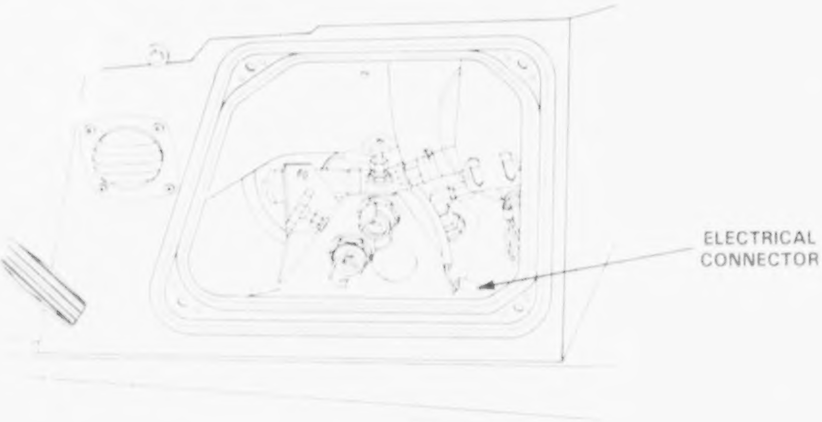
Step 1. Remove engine left side access cover.
Step 2. Disconnect electrical connector.
Step 3. Loosen hose clamps on pump.
Step 4. Compress inlet water hose.
Step 5. Remove pump from mounting support.
Step 6. Remove pump from water hose.
Step 7. Remove mounting clamp from pump.

b. Replace.

Step 1. Put mounting clamp on pump. Do not tighten.

TA259252

Step 2. Put pump in place. Do not tighten.
Step 3. Connect water hoses.
Step 4. Tighten bracket.
Step 5. Tighten clamp on pump.
Step 6. Tighten clamps on water hoses.
Step 7. Connect electrical connector.
Step 8. Add coolant.
Step 9. Bleed cooling system. Refer to paragraph 3-23.
Step 10. Check for leaks and correct operation of pump.



3-75. REMOVE AND REPLACE BATTERIES.

a. Remove.

WARNING

Battery Safety — Batteries can be dangerous if not handled properly. When working with batteries, use the following guidelines to insure your safety:

Wear rubber gloves and goggles when working with electrolyte. Do not get electroyte on your skin. Electrolyte can cause serious skin burns.

When removing battery cables, disconnect both negative (–) cables first. When installing battery cables, connect negative (–) cables last. Negative (–) cables must be disconnected prior to working on equipment where shorting of cables can occur.

Always be sure that the correct cables go to the correct battery terminals. Incorrect cable installation is extremely dangerous.

Keep all tools away from batteries. Do not smoke or have an open flame nearby while charging batteries.

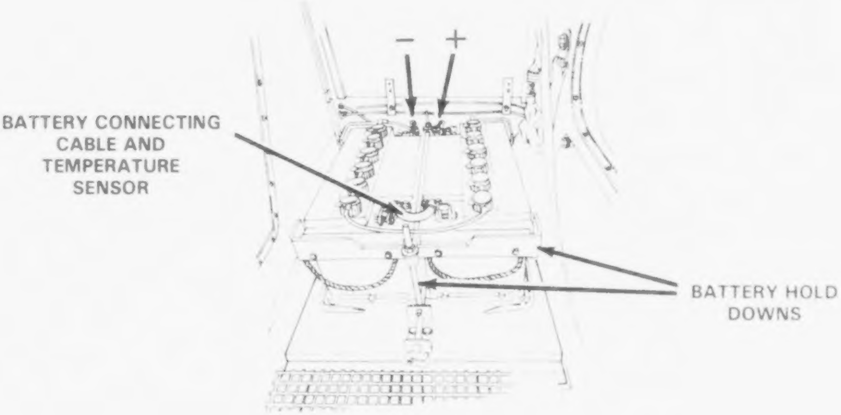
TA259253

Step 1. Remove battery cover.
Step 2. Note position that batteries are mounted.

CAUTION

Care must be taken not to damage temperature sensor.

Step 3. Tag and disconnect battery negative (-) cable.
Step 4. Tag and disconnect battery positive (+) cable.
Step 5. Disconnect cable connecting batteries.
Step 6. Disconnect vent tube from battery.
Step 7. Remove battery hold downs.
Step 8. Remove batteries.



b. Replace.

CAUTION

Care must be taken not to damage temperature sensor.

Step 1. Put batteries in place.
Step 2. Put battery holddowns in place. Secure batteries.
Step 3. Connect vent tubes to battery.
Step 4. Connect cable connecting batteries together.
Step 5. Using location tag, connect positive (+) cable to battery.
Step 6. Using location tag, connect negative (-) cable to battery.
Step 7. Lubricate battery terminals. Refer to LO 9-2350-272-12.
Step 8. Check operation of batteries.
Step 9. Replace battery cover.

3-76. REMOVE AND REPLACE BATTERY HEATER.

a. Remove.

TA259254

Step 1. Remove batteries. Refer to paragraph 3-75.
Step 2. Disconnect electrical connector.
Step 3. Remove heater plate.

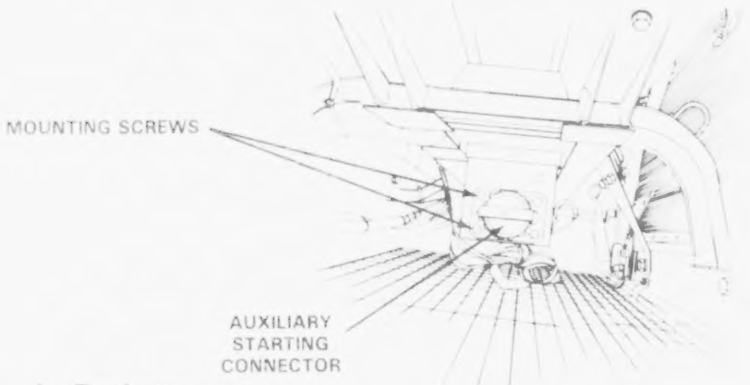
b. Replace.

Step 1. Replace heater plate.
Step 2. Connect electrical connector.
Step 3. Replace batteries. Refer to paragraph 3-75.

3-77. REMOVE AND REPLACE AUXILIARY STARTING CONNECTOR.

a. Remove.

Step 1. Remove battery cover.
Step 2. Disconnect battery negative (-) cable.
Step 3. Move drivers seat to forward position.
Step 4. Remove box cover.
Step 5. Remove four screws and nuts holding auxiliary starting connector in place.
Step 6. Tag and remove cables from terminal block.
Step 7. Remove auxiliary starting connector.



b. Replace.

Step 1. Put auxiliary starting connector in place.
Step 2. Put in four screws. Put on and tighten nuts.
Step 3. Using location tags connect cables to terminal block.
Step 4. Put box cover in place. Put in and tighten screws.
Step 5. Connect battery ground (-) cable.
Step 6. Put battery cover in place.

3-78. REMOVE AND REPLACE FRONT CAR FAN MOTOR.

a. Remove.

Step 1. Remove heater fan assembly. Refer to paragraph 3-135.
Step 2. Remove ring mounting screws on both sides. Remove rings and housing.

TA259255

Step 3. Loosen screws holding fans on fan shaft.
Step 4. Remove bracket holding fan motor.
Step 5. Remove fans.
Step 6. Disconnect electric wires from motor.
Step 7. Remove motor.

b. Replace.

Step 1. Put motor in place. Do not secure.
Step 2. Connect electric wires.
Step 3. Put fans on motor shaft. Do not tighten.
Step 4. Put clamp bracket in place. Put in and tighten bracket screw.
Step 5. Tighten screws on fans.
Step 6. Put rings in housing. Replace housing. Screw in and tighten screws.
Step 7. Make sure fans turn freely without rubbing housing.
Step 8. Replace heater fan assembly. Refer to paragraphs 3-135.

3-79. REMOVE AND REPLACE REAR CAR HEATER FAN MOTOR.

a. Remove.

Step 1. Remove heater fan assembly. Refer to paragraph 3-137.
Step 2. Loosen screw holding fan on fan shaft.
Step 3. Tag and remove electric wires from fan motor.
Step 4. Mark position of motor in clamp.
Step 5. Remove screw holding motor clamp.
Step 6. Remove fan motor.

b. Replace.

Step 1. Using position mark, put fan motor in place.
Step 2. Screw in and tighten screw in motor clamp.
Step 3. Using location tags, connect electrical wires.
Step 4. Tighten screw holding fan on fan shaft.
Step 5. Make sure fan turns freely.
Step 6. Replace heater fan assembly. Refer to paragraph 3-137.

3-80. REMOVE AND REPLACE ELECTRICAL SOCKETS.

a. Remove.

Step 1. Tag and disconnect electrical wires.
Step 2. Remove retaining nut and washer.
Step 3. Remove socket.

b. Replace.

Step 1. Put socket in place.
Step 2. Put on washer and retaining nut.
Step 3. Connect electrical wires. Remove tags.

3-81. REMOVE AND REPLACE ANTENNA MOUNT.

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove mount.

b. Replace.

Step 1. Put mounting in place.
Step 2. Put in screws. Tighten screws.

3-82. REMOVE AND REPLACE TRAILER ELECTRICAL CONNECTOR.

a. Remove.

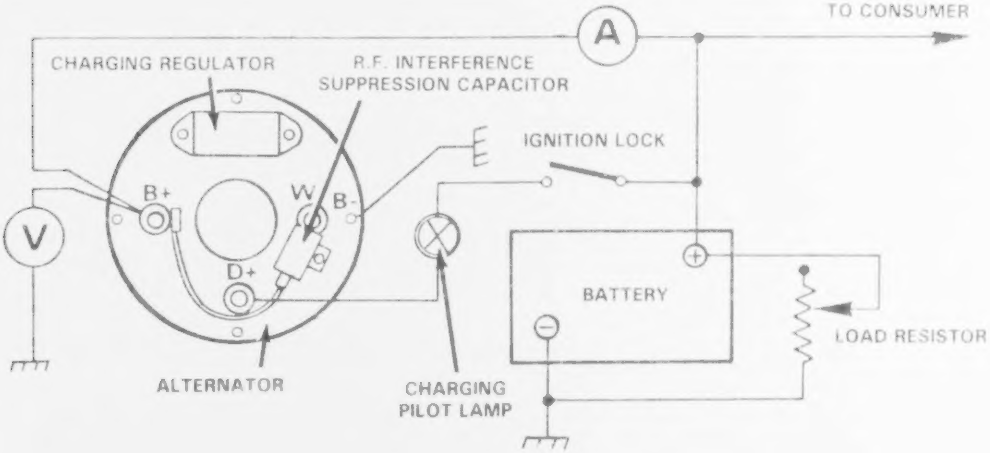
Step 1. Tag and disconnect connector harness wires.
Step 2. Remove nuts and washers from mounting screws.
Step 3. Remove connector cover.
Step 4. Remove connector with harness.

b. Replace.

Step 1. Put connector with harness in place.
Step 2. Put on connector cover.
Step 3. Put in mounting screws, washers and nuts. Tighten nuts.
Step 4. Connect harness wires. Remove tags.

3-83. TEST ALTERNATOR.

Step 1. Remove engine right side access cover.
Step 2. Connect voltmeter between B + and chassis ground.



TO CONSUMER
A
CHARGING REGULATOR
R.F. INTERFERENCE SUPPRESSION CAPACITOR
IGNITION LOCK
B+
W
B-
V
D+
BATTERY
LOAD RESISTOR
ALTERNATOR
CHARGING PILOT LAMP

TA259256

Step 3. Start engine.
Step 4. Turn on high beam head lights.
Step 5. Run engine at 1900 RPM. Voltmeter gage should read between 27.6 and 28.4 volts.

NOTE

Replace alternator if reading is other than 27.6 to 28.4 volts.

3-84. TEST START INTERLOCK.

NOTE

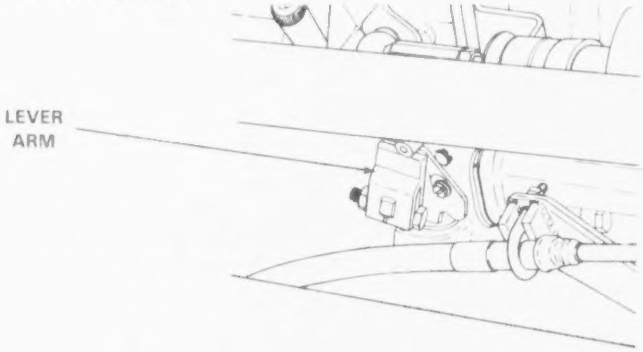
Shift linkage must be properly adjusted

Step 1. Remove engine cover.
Step 2. Disconnect electrical plug from start interlock switch.
Step 3. Place gear selector in neutral.
Step 4. Check continuity between pins 3 and 4 on start interlock switch. Continuity must read 0.
Step 5. Place gear selector in drive.
Step 6. Check continuity between pins 3 and 4 on start interlock switch. Continuity must read infinity.
Step 7. Check continuity between pins 1 and 2. Continuity must read 0.
Step 8. Move gear selector to reverse position.
Step 9. Check continuity between pins 1 and 2. Continuity must read infinity.
Step 10. If any incorrect readings are obtained switch is defective.
Step 11. Connect electrical plug.
Step 12. Replace engine cover.

3-85. REMOVE, REPLACE AND ADJUST START INTERLOCK SWITCH.

a. Remove.

Step 1. Remove engine cover.
Step 2. Disconnect linkage from lever arm.
Step 3. Remove lever arm nut and screw.
Step 4. Remove lever arm front switch.
Step 5. Disconnect electrical plug from switch.
Step 6. Remove switch mounting screws.
Step 7. Remove switch.



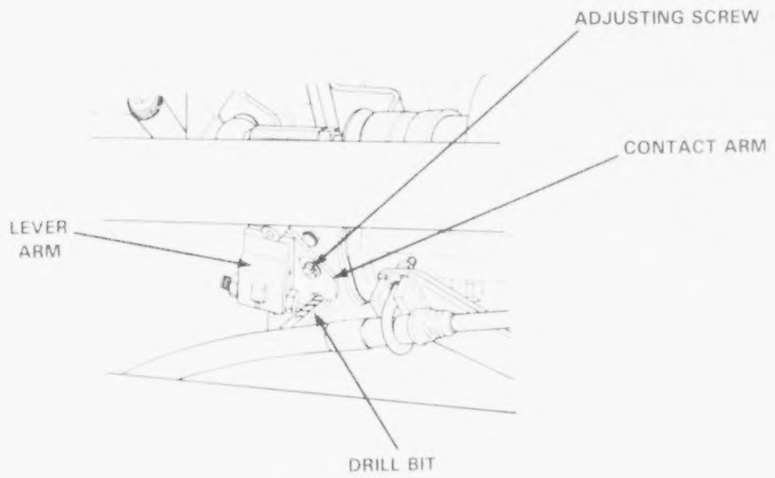
TA259257

b. Replace.

Step 1. Put on start interlock switch.
Step 2. Put in mounting screws. Tighten screws.
Step 3. Connect electrical plug to switch.
Step 4. Put lever arm on switch.
Step 5. Tighten lever arm nut.
Step 6. Connect linkage to lever arm.
Step 7. Replace engine cover.

c. Adjust.

Step 1. Place gear selector in neutral (N) position.
Step 2. Put a 4 mm drill bit into head of mounting screw.
Step 3. Loosen adjusting screw.
Step 4. Move contact arm until notch in arm contacts the drill bit.
Step 5. Tighten adjusting screw.
Step 6. Remove drill bit.



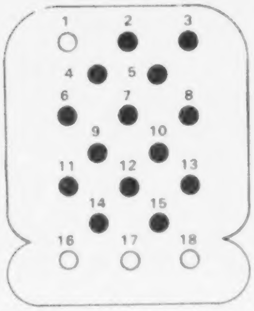
3-86. TEST PARKING BRAKE SWITCH.

Step 1. Tag and disconnect electrical wires.
Step 2. Connect ohmmeter to switch leads.
Step 3. Depress switch button.
Step 4. Check for continuity. If continuity is not obtained, replace switch.

3-87. TEST DIRECTIONAL SIGNAL SWITCH.

Step 1. Disconnect directional signal switch connector from harness connector.
Step 2. Perform the continuity test specified in the directional signal switch continuity guide.

TA259341



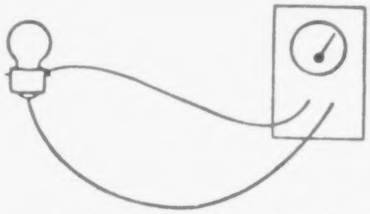
DIRECTIONAL SIGNAL SWITCH CONNECTOR

DIRECTIONAL SIGNAL SWITCH CONTINUITY GUIDE

SWITCH POSITION	FROM TERMINAL	TO TERMINAL
Low Beam (Lever Down)	8	9
High Beam (Lever Up)	9	7
High Beam Signal (Lever Towards Steering Wheel)	9	7
Left Turn Signal	2	4
Right Turn Signal	2	3
Horn (Center Button Pushed In)	13	14
Windshield Wiper 1st Speed	13	12
Windshield Wiper 2nd Speed	13	11
Windshield Washer (Collar Pushed In)	13	6

3-88. TEST INCANDESCENT LIGHT.

Step 1. Remove light from fixture.
Step 2. Place one ohmmeter probe on lower bulb contact.
Step 3. Place the other probe on the side contact.



Step 4. Check ohmmeter reading. Refer to bulb resistance list for proper bulb resistance. If ohmmeter reads proper resistance, put bulb back in fixture. If ohmmeter does not read proper resistance, replace bulb.

BULB RESISTANCE LIST

BULB TYPE	RESISTANCE RANGE
Central indicator panel bulbs, hazard warning switch.	20Ω – 100Ω
Taillights, marker lights, turn signals, brake lights, dome lights.	0Ω

3-89. TEST BATTERIES (Refer to TM 9-6140-200-14).

a. Checking batteries for operational charge.

Step 1. Turn off all vehicle accessories.
Step 2. Connect a voltmeter across batteries positive and negative terminals.
Step 3. Read voltmeter. Meter should read 25 to 28 volts. If meter reads lower than 24 volts, perform a specific gravity check.

b. Checking specific gravity.

Optimum specific gravity varies with climatic conditions. Optimum specific gravities, temperature corrected, are given below:

Temperate Zones	1.260 – 1.280 nominal
Tropical Zones	1.260 max. – 1.200
Arctic Zones	1.280 min.

c. Checking battery water level.

A satisfactory operating battery charging system requires periodic addition of water to cells to restore losses due to evaporation and charging. The most negative cell will use the most water and the most positive, the least. The water level change from cell to cell should be uniform; if it is not, the probable cause is a defective cell. Add water, as required, up to the fill ring. Always use distilled water when available. If distilled water is not available, use drinking water. Undistilled water can shorten battery life, but it is not as harmful as a cell which becomes dry.

d. Checking for self discharge.

Batteries in vehicle not in operation will self discharge through local action. This self discharge will reduce specific gravity as follows:

Ambient Temperature (°F)	**Loss/Day** (Points)
120	6
100	3
60	1
0	0.3
–40	0.1

NOTE

A point is 0.001 of specific gravity value.

Due to this self discharge, fully charged batteries in storage or installed in a vehicle and not in use should be periodically recharged. A battery which has self discharged can generally be restored to serviceable condition by charging 110% of the ampere-hours lost. If the battery gases violently and the specific gravity does not increase, sulfation and possible end of service life is indicated.

e. Specific gravity checks.

Observe the following to obtain accurate specific gravity measurements. Proper specific gravity assures full charge, but does not establish that batteries can provide the current required. Follow instructions below for type battery test being used.

NOTE

(1) The electrolyte in a cell should be at normal level when reading is taken.
(2) Distilled water added to cell will remain at top of cell and reading will be inaccurate. If water is added, battery should be charged for 1 or 2 hours before specific gravity checks are made. Charging may be done by connecting battery or batteries to a charger or by operating vehicle.
(3) Do not check specific gravity immediately after battery has been discharged at a high rate, such as prolonged cranking. Wait several hours before taking specific gravity readings.
(4) When temperature of electrolyte is not 80°F (26.7°C), specific gravity of tester requires a temperature correction. Refer to battery tester instructions or TM 9-6140-200-14.
(5) Temperature corrected specific gravity readings should be within 25 points of other cells. Average specific gravity for batteries in service should be as specified (b above). Batteries not measuring optimum specific gravity or having greater than a 25 point variation, should be placed on charge. Batteries placed on charge must recover to 1.280 regardless of optimum specific gravity desired in service.

3-90. TEST INSTRUMENT PANEL SWITCHES.

a. Light switch.

Step 1. Remove switch.
Step 2. Perform continuity test as specified.

LIGHT SWITCH TEST GUIDE

SWITCH POSITION	FROM TERMINAL	TO TERMINAL	OHMMETER READING
Off	2	3	Open
Off	2	6	Open
I	2	6	0
II	2	3	0
II	2	6	0

b. Glow plug/engine off.

Step 1. Remove switch.
Step 2. Perform continuity test as specified.

SWITCH TEST GUIDE

SWITCH POSITION	FROM TERMINAL	TO TERMINAL	OHMMETER READING
Off	4	7	Open
Off	2	3	Open
Down	7	3	0
Up	2	4	0

c. Bilge pump/circulating pump.

Step 1. Remove switch.
Step 2. Perform continuity test as specified.

SWITCH TEST GUIDE

SWITCH POSITION	FROM TERMINAL	TO TERMINAL	OHMMETER READING
Off	1	5	Open
On	1	5	0

d. Blackout switch.

Step 1. Remove blackout switch. Refer to paragraph 3-62.
Step 2. Turn switch to blackout position.
Step 3. Make continuity check between terminals 2 and 1 and between terminals 9 and 10. Continuity must read 0. If continuity does not read 0, switch is defective.
Step 4. Turn switch to normal light position.
Step 5. Make continuity check between terminals 2 and 3, terminals 6 and 7, and between terminals 10 and 11. Continuity must read 0. If continuity does not read 0, switch is defective.

3-91. TEST WINDSHIELD WIPER RELAY.

Step 1. Remove windshield wiper relay. Refer to paragraph 3-64.
Step 2. Make continuity check between terminals 30 and 87 on relays. Continuity must read infinity. If continuity is not infinity, relay is defective.
Step 3. Connect 24 V power source to terminals 85 and 86. Make continuity check between terminals 30 and 87. Continuity must read 0. If continuity is not 0, relay is defective.
Step 4. Replace relay. Refer to paragraph 3-64.

3-92. TEST AUTOMATIC TRANSMISSION FIRST GEAR SWITCH.

Step 1. Remove left engine access cover.
Step 2. Disconnect and tag electrical wires.
Step 3. Use ohmmeter, connect test leads to switch terminals.
Step 4. Read ohmmeter, ohmmeter should read open circuit. If ohmmeter does not read open circuit, replace first gear switch.
Step 5. Push in on first gear switch button.
Step 6. Read ohmmeter, ohmmeter should read 0 ohms. If ohmmeter does not read 0 ohms, replace first gear switch.

3-93. TEST IGNITION SWITCH.

Step 1. Remove ignition switch. Refer to paragraph 3-64.
Step 2. Turn switch to off position.
Step 3. Make continuity check between the following switch terminals: 30 and 75, 30 and 50, 30 and 15. If continuity does not read open, switch is defective.
Step 4. Turn switch to ignition switch position.
Step 5. Make continuity check between terminals 30 and 75. Continuity must read 0. If continuity does not read 0, switch is defective.
Step 6. Turn switch to ignition position.
Step 7. Make continuity check between terminals 30 and 75, also between terminals 30 and 15. Continuity must read 0. If continuity does not read 0, switch is defective.
Step 8. Turn switch to start position.
Step 9. Make continuity check between terminals 30 and 15, also between terminals 30 and 50. Continuity must read 0. If continuity does not read 0, switch is defective. Replace switch. Refer to paragraph 3-64.

3-94. TEST MAIN SWITCH RELAY.

Step 1. Remove main switch relay. Refer to paragraph 3-61
Step 2. Make continuity check between large terminals. Continuity must read open. If continuity is not open, relay is defective.
Step 3. Connect 24 V power source to terminals 31 and 50. Make continuity check between large terminals. Continuity must read 0. If continuity does not read 0, relay is defective. Replace relay. Refer to paragraph 3-61.

3-95. TEST PREHEATER RELAY.

Step 1. Remove relay. Refer to paragraph 3-70.
Step 2. Make continuity check between two large terminals. Continuity must read open. If continuity does not read open, relay is defective.
Step 3. Connect 24V DC power source to terminals 31 and 50. Make continuity check between large terminals. Continuity must read 0. If continuity does not read 0, relay is defective.
Step 4. Replace relay. Refer to paragraph 3-70.

3-96. TEST RHEOSTAT.

Step 1. Disconnect electrical wires from rheostat. Refer to paragraph 3-64.
Step 2. Turn rheostat to off position.
Step 3. Connect ohmmeter to terminals of rheostat. Continuity must read 0. If ohmmeter does not read 0, rheostat is defective.
Step 4. Slowly rotate the rheostat control. Needle on ohmmeter must move across scale as control is rotated. If needle does not move or moves erracticly, rheostat is defective. Replace rheostat. Refer to paragraph 3-64.
Step 5. Disconnect ohmmeter.
Step 6. Connect electrical wires to rheostat.

3-97. TEST FUEL INDICATOR SYSTEM.

a. Checking system for current.

Step 1. Make sure all electrical connections are clean and tight.
Step 2. Turn on ignition switch.
Step 3. Connect voltmeter to fuel gage positive terminal.
Step 4. Determine if system has current. System must have current to complete test. If no current is available, troubleshoot circuit. Turn ignition off.

b. Fuel gage reads ''0'' (Empty).

Step 1. Using jumper wire, connect terminal marked G on fuel gage to ground.
Step 2. Turn ignition switch on. If pointer on gage swings beyond 4/4, the gage is OK. Go to Step 3. If the pointer on gage does not swing beyond 4/4 the gage is defective. Replace gage. refer to paragraph 3-59.
Step 3. Turn switch off.
Step 4. Disconnect lead 3H from fuel sending unit. Connect lead to ground.
Step 5. Turn ignition switch on. If the pointer on fuel gage does not swing beyond 4/4, the lead is defective. Replace lead. If the pointer on fuel gage swings beyond 4/4, the lead is OK. Turn off ignition. Go to Step 6.
Step 6. Remove fuel level transmitter. Refer to paragraph 3-10.

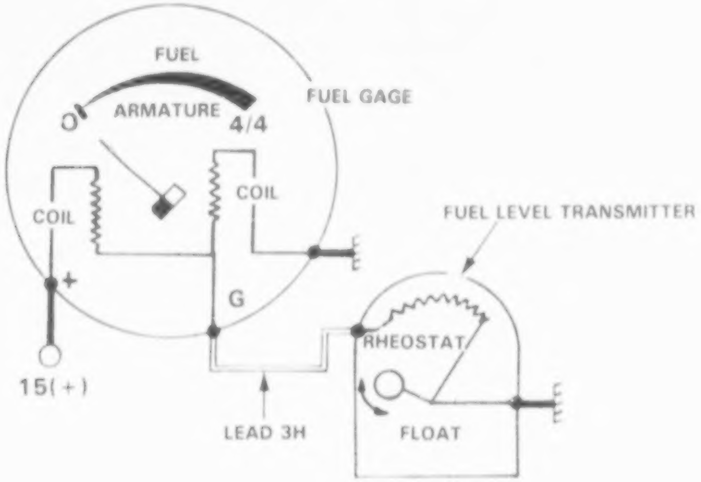
NOTE

With the float in the top position (full) the resistance will be 0 to 2 ohms. With the float in the bottom position (empty) the resistance will be 50 to 70 ohms.

Step 7. Connect ohmmeter to fuel level transmitter.

Step 8. Move the float up and down. The ohmmeter will follow the movement of the float without flutter or hesitation. If the fuel level transmitter has flutter or hesitation, it is defective.

Step 9. Replace fuel level transmitter. Refer to paragraph 3-10.



FUEL GAGE, SCHEMATIC DIAGRAM

c. Fuel gage reads 4/4 (full).

Step 1. Disconnect lead at fuel level transmitter.

Step 2. Turn iginition switch on.

Step 3. Keep wire away from ground. If the pointer on gage swings to 0 (empty) the lead and the gage are OK. Connect lead to fuel level transmitter and go to step 6. If pointer on gage does not swing to 0 (empty), connect lead to fuel level transmitter and go to step 4.

Step 4. Disconnect lead 3H from fuel gage. If pointer on gage swings to "0" (empty) the fuel gage is OK. If pointer on gage does not swing to "0" (empty), the problem is a faulty connection or damaged lead. Clean connector or replace lead.

Step 5. Remove fuel level transmitter. Refer to paragraph 3-10.

NOTE

With the float in the bottom position "0" (empty), the resistance will be 50 to 70 ohms. With the float in the top position 4/4 (full), the resistance will be 0 to 2 ohms.

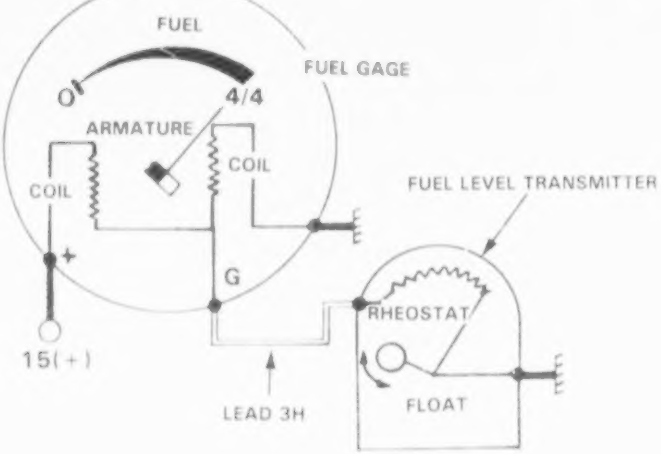
Step 6. Connect ohmmeter to fuel level transmitter.

Step 7. Move the float up and down. The ohmmeter will follow the movement of the float

TA259260

without flutter or hesitation. If fuel level transmitter has flutter or hesitation it is defective.

Step 8. Replace fuel level transmitter.


FUEL
FUEL GAGE
O
4/4
ARMATURE
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COIL
+
G
15(+)
FUEL LEVEL TRANSMITTER
RHEOSTAT
FLOAT
LEAD 3H

FUEL GAGE, SCHEMATIC DIAGRAM

3-98. TEST BRAKE WARNING SWITCH.

Step 1. Remove engine hood and cover.

Step 2. Press and hold brake pedal. Do not release pedal.

Step 3. Turn on ignition switch.

Step 4. Open one of the brake cylinder bleed nipples.

Step 5. Check warning light. Light should go on. If light is not on replace brake warning switch.

Step 6. Close brake cylinder bleed nipple.

Step 7. Release brake pedal.

Step 8. Check operation of brake and warning light. Warning light should be out.

Step 9. Turn off ignition switch.

Step 10. Check and fill brake master cylinder, if necessary. Refer to LO 9-2350-272-12. Replace engine hood.

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Section V. BRAKE SYSTEM MAINTENANCE INSTRUCTIONS

3-99. REMOVE, DISASSEMBLY, CLEAN, ASSEMBLE AND REPLACE BRAKE ASSEMBLY.

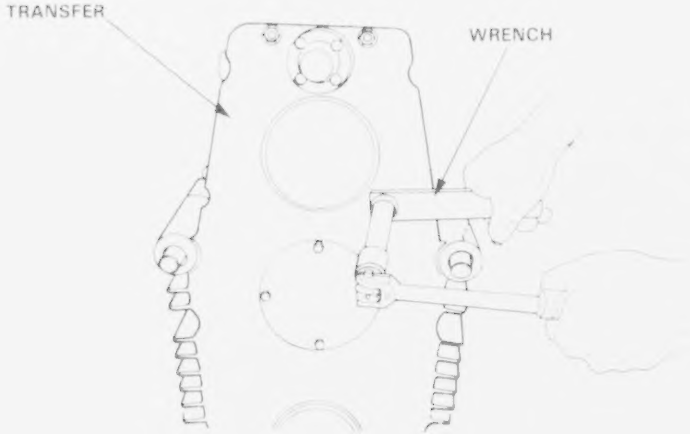
a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Clean transfer, brake assembly and adjacent areas.

CAUTION

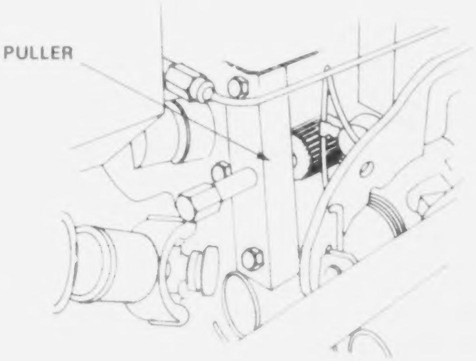
Handle protective seals with care. Damage to seals will let car fill with water during swimming operation.

Step 3. Remove exhaust fan. Refer to paragraph 3-24.
Step 4. Place transfer shift lever in neutral. Remove transfer shift rod. Refer to paragraph 3-34.
Step 5. Tag and disconnect electrical wire from speedometer sensor.
Step 6. Disconnect parking brake cable from brake assembly.
Step 7. Remove transmission-to-transfer propeller shaft and distance sleeve.
Step 8. Disconnect brake lines at each end. Slide lines out of the way.
Step 9. Plug brake lines and openings.
Step 10. Loosen screw in transfer shift arm to dissengage shift shaft.
Step 11. Use wrench to remove screws on backside (as you face transfer) of transfer holding brake to transfer. Refer to Table 2-1, item 8. Place wrench along side of transfer to reach screws.



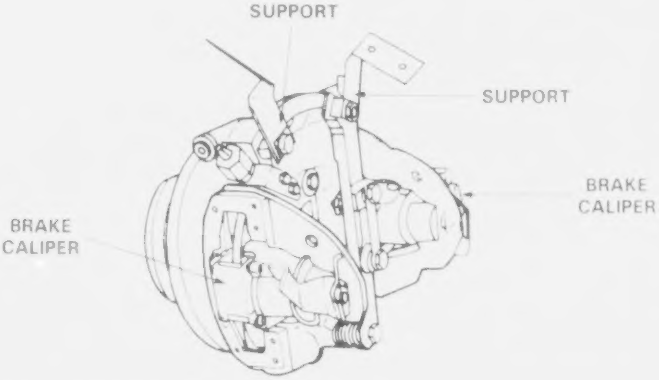
TA259262

Step 12. Remove nuts holding rubber seals and backing ring to car.
Step 13. Using puller, pull brake assembly until it is free of the transfer. See Table 2-1, item 9.
Step 14. Remove brake assembly.

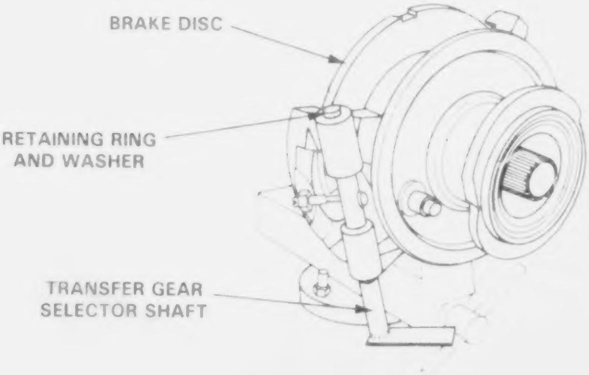


b. Disassemble.

Step 1. Remove bolts and lockplates. Remove brake caliper assemblies.
Step 2. Remove bolts and locking washers. Remove supports.

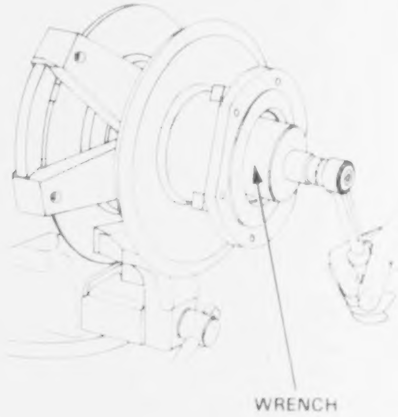

SUPPORT
SUPPORT
BRAKE CALIPER
BRAKE CALIPER

Step 3. Remove bolts and washers. Remove brake disc.
Step 4. Remove locknut, screw, retaining ring and washer from selector shaft. Pull out transfer-case gear selector shaft.


BRAKE DISC
RETAINING RING AND WASHER
TRANSFER GEAR SELECTOR SHAFT

TA259263

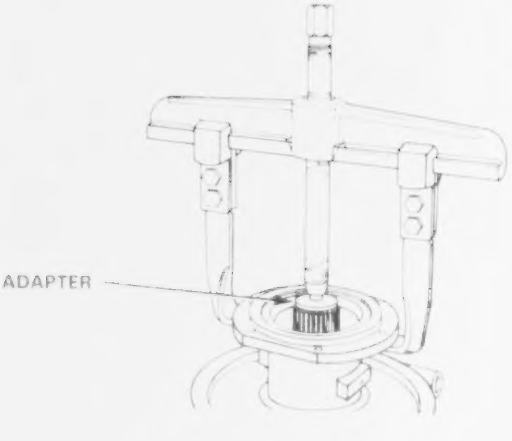
Step 5. Loosen clamp.
Step 6. Remove rubber bellows.
Step 7. Open tang on lockwasher, using wrench, see Table 2-1, item 17, and remove nut on brake shaft. Remove washer.



WARNING

Handle hot metal components with pliers or wear insulated gloves to avoid serious injuries.

Step 8. Heat bearing housing to 176°F (80°C).
Step 9. Using adapter, see Table 2-1, item 15, and puller, press out brake shaft.



NOTE

If front bearing is on brake shaft, do steps 10-13 and 18-22. If front and rear bearings are in brake housing, do steps 14-22.

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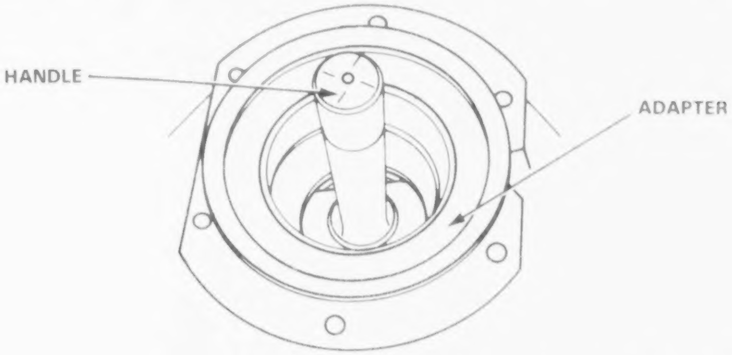
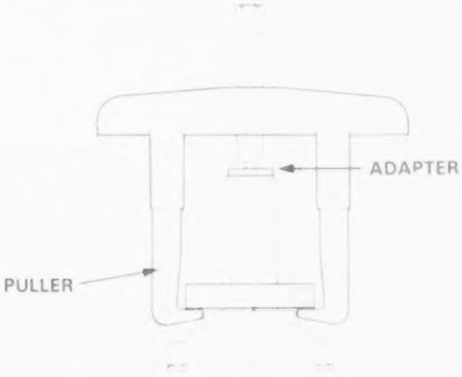
Step 10. Remove preformed packing from bearing housing.

Step 11. Using handle and adapter, see Table 2-1, item 6 and 14, press out rear bearing from housing.



Step 12. Remove spacer, ring holder with ring and preformed packing from shaft.

Step 13. Using puller adapter, see Table 2-1, item 15, and puller, remove front bearing from brake shaft.

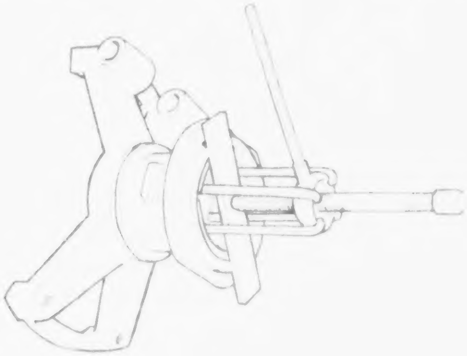


WARNING

To avoid burns after heating metal components wear insulated gloves or handle components with pliers.

Step 14. Heat bearing housing to 176°F (80°C).

Step 15. Using puller and support plate, remove rear bearing from housing.



TA259265

Step 16. Remove spacer, ring holder with ring from shaft.
Step 17. Using handle and adapter, see Table 2-1, item 6 and 14, press out front bearing and washer from housing.
Step 18. Remove preformed packing from housing.
Step 19. Remove retaining ring.
Step 20. Remove support bearing from brake shaft.
Step 21. Press our transfer-case gear selector shaft bushings from bearing housing.
Step 22. Remove air filter from bearing housing.

c. Cleaning, inspection and repair.

(1) Cleaning.

WARNING

Dry cleaning solvent, federal specification P-D-680, Type II, is flammable and gives off harmful vapors. Use solvent only in a well ventilated area. Avoid prolonged breathing of solvent vapors. Keep solvent away from flame. Do not use solvent in excessive amounts.

CAUTION

Do not clean brake calipers or pads with dry cleaning solvent.

Step 1. Clean bearing housing, bearings and other components with dry cleaning solvent.
Step 2. Dry bearing housing, bearings, and other components.

(2) Inspection.

Step 1. Inspect bearing housing for cracks, and damage.
Step 2. Inspect transfer-case selector.
Step 3. Inspect brake shaft for cracks, damage, and bolt hole elongation.
Step 4. Inspect bearings for damage.
Step 5. Inspect other components for cracks, breaks, bolt hole elongation and damage.

(3) Repair.

Step 1. Replace seals with new seals.
Step 2. Replace all damaged components with new components.

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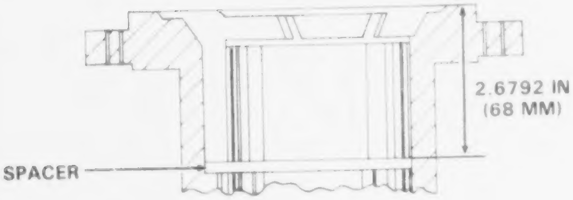
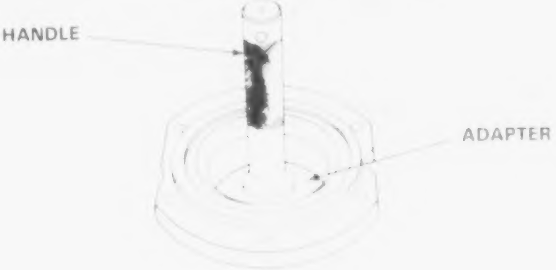
d. Assemble.

Step 1. Install air filter in bearing housing.

Step 2. Measure depth of rear bearing housing, from other end of housing to bearing shoulder. Depth must be 2.6792 in. (68 mm). If depth measures 2.8762 in. (73 mm) install 0.197 in. (5 mm) spacer ring in housing, using handle and adapter, see Table 2-1, item 6 and 11.





Step 3. Put locktite 601 in housing in rear bearing mating surface.

Step 4. Using handle and adapter, see Table 2-1, item 6 and 11, press rear bearing in place.

Step 5. Put ring holder and ring in place on spacer.

Step 6. Lubricate seal edges of spacers, put spacer in place in bearing housing.

NOTE

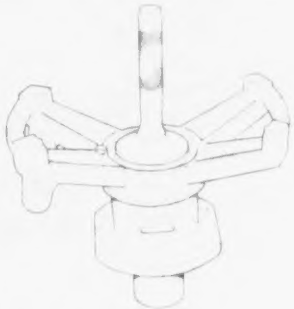
Bevel side of washer must face preformed packing.

Step 7. Put preformed packing and washer in place in housing.

Step 8. Use drift pin, see Table 2-1, item 16. Put bearing housing on draft pin.

Step 9. Put locktite 601 in housing on front bearing mating surface.

Step 10. Using handle and adapter, see Table 2-1, item 6 and 11 press front bearing in place.



NOTE

Brake disc index A must face towards brake shaft.

Step 11. Assemble brake disc on brake shaft.

Step 12. Put lockplates and bolts in place.

Step 13. Torque bolts to 38 lb. ft. (52.5 Nm).

Step 14. Bend tang of lockplates to secure bolts.

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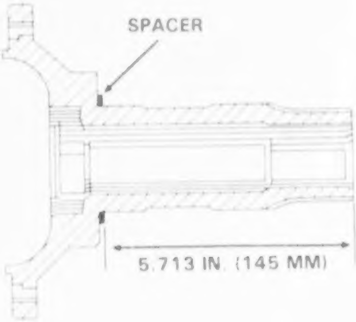
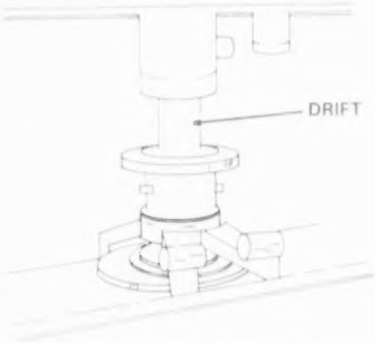
Step 15. Measure length of brake shaft from shaft end to bearing shoulder. Length must be 5.713 in. (145 mm). If length measures 5.7524 in. (146 mm) press 0.0394 in. (1 mm) spacer on brake shaft.

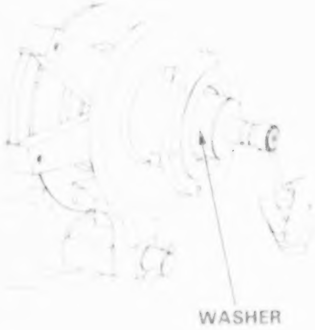


Step 16. Using drift, see Table 2-1, item 16, press bearing housing on brake shaft.



Step 17. Put lockwasher and nut in place on brake shaft.

Step 18. Using wrench, see Table 2-1, item 17, tighten nut, bend tang on washer into groove of nut.



Step 19. Press transfer-case gear selector shaft bushings in place in bearing housing.

Step 20. Put washer and retaining ring in place at lever end of transfer-case gear selector shaft.

Step 21. Put transfer-case gear selector shaft in place.

Step 22. Put washer, retaining ring, screw and locknut in place on transfer-case gear selector shaft.

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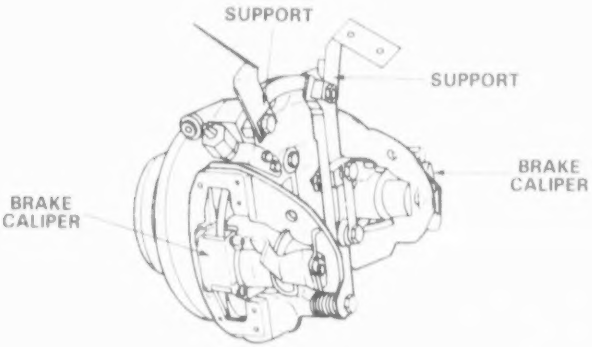
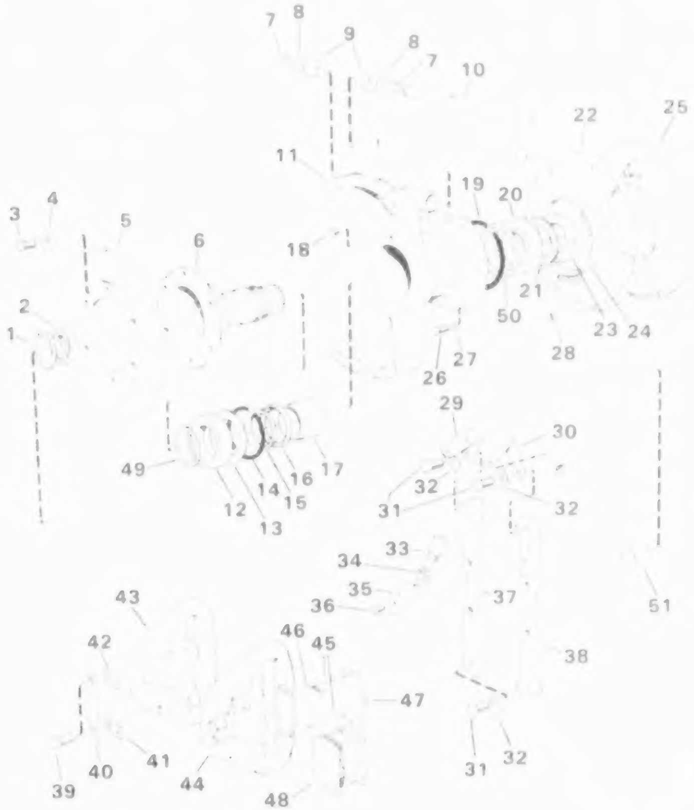
Step 23. Put supports, brackets, lockplates and bolts in place.


SUPPORT
SUPPORT
BRAKE CALIPER
BRAKE CALIPER

Step 24. Torque bolts to 67 lbs. ft. (91.2 Nm).
Step 25. Bend tangs on lockplates to secure bolts.
Step 26. Put brake calipers, lockplates and bolts in place.
Step 27. Torque bolts to 107 lbs. ft. (145 Nm).
Step 28. Bend tangs of lockplates to secure bolts.
Step 29. Put rubber bellows and clamp in place. Do not tighten clamp.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1. RETAINING RING
2. SUPPORT BEARING
3. BOLT
4. WASHER
5. BRAKE DISC
6. BRAKESHAFT
7. RETAINING RING
8. WASHER
9. BUSHING
10. SHAFT
11. BEARING HOUSING
12. BEARING
13. PREFORMED PACKING
14. PREFORMED PACKING
15. RING
16. RING, HOLDER
17. SPACER
18. AIR FILTER
19. PREFORMED PACKING
20. BEARING
21. LOCKWASHER
22. RING
23. NUT
24. CLAMP
25. BELLOW
26. BOLT
27. WASHER
28. NUT
29. BRACKET
30. BRACKET
31. BOLT
32. LOCKPLATE
33. SENSOR
34. NUT
35. BRACKET
36. BOLT
37. SUPPORT
38. SUPPORT
39. BOLT
40. LOCKPLATE
41. LOCKPLATE
42. LOCKPLATE
43. CALIPER CARRIER PLATE
44. CALIPER CARRIER PLATE
45. PAD GUIDE PIN
46. COTTER PIN
47. SPRING
48. BRAKE PADS
49. SPACER
50. SPACER
51. SPACER, SLEEVE

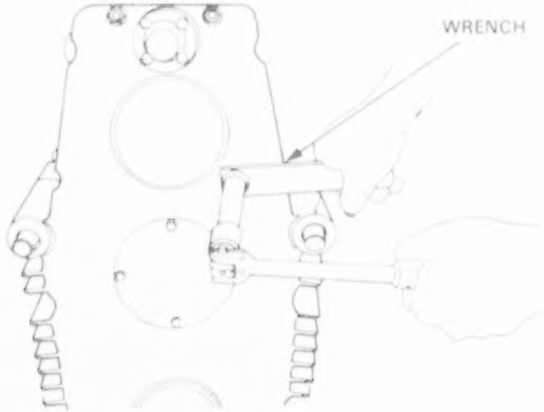
e. Replace.

Step 1. Remove snap ring and support bearing from brake assembly.
Step 2. Put rubber seals and backing ring on brake assembly.
Step 3. Put new preformed packing on transfer.
Step 4. Put brake assembly in place.

NOTE

Make sure seal is in alignment with screw holes and does not shift when tightening screws.

Step 5. Put sealant on body to seal rubber bellows.
Step 6. Put rubber seal and backing ring in place.
Step 7. Put on and tighten nuts.
Step 8. Using wrench put in screws mounting transfer to brake assembly. See Table 2-1, item 8. Torque screws to 23 lb. ft. (31 Nm).



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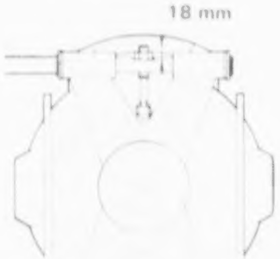
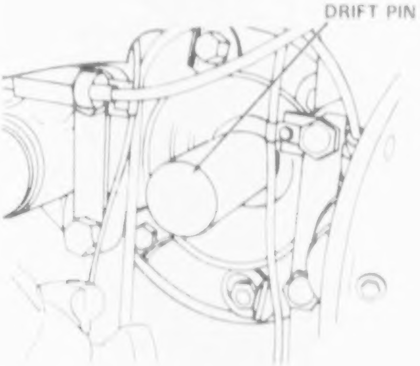
Step 9. Screw ball screw into shift shaft until screw is 7/8 in. (18 mm) above locknut plane.



Step 10. Tighten rubber seal collar and clamp.
Step 11. Put support bearing in place. Using drift pin. See Table 2-1, item 7.
Step 12. Put snap ring in place.



Step 13. Put distance sleeve on shaft.
Step 14. Unplug and put brake lines in place. Tighten fittings.
Step 15. Put clamps in place. Tighten screws.
Step 16. Replace transmission to transfer propeller shaft.
Step 17. Put heat shield in place. Put in and tighten screws.
Step 18. Using location tags, connect electrical wire to speedometer sensor.
Step 19. Replace transfer shift rod. Refer to paragraph 3-34.
Step 20. Replace exhaust pipe. Refer to paragraph 3-24.
Step 21. Connect parking brake cable.
Step 22. Bleed brakes. Refer to paragraph 3-101.
Step 23. Check for brake fluid leaks and correct brake operation.
Step 24. Replace engine hood and cover.

3-100. REMOVE AND REPLACE MASTER CYLINDER.

a. Remove.

Step 1. Disconnect brake lines at master cylinder plug connections.
Step 2. Tag and disconnect electrical wires from brake light switch and warning valve switch.
Step 3. Remove nuts and washers holding brake pedal assembly to car. Screws are removed from outside.
Step 4. Remove brake pedal assembly.
Step 5. Remove screws holding master cylinder to brake pedal bracket.

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Step 6. Remove cotter pin and washer.
Step 7. Remove pin holding master cylinder push rod to brake pedal.
Step 8. Remove master cylinder from brake pedal bracket.

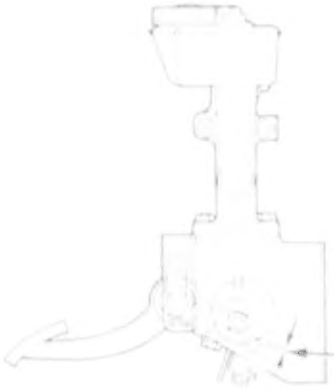
b. Replace.

Step 1. Put master cylinder in place on brake pedal bracket.
Step 2. Connect master cylinder to brake pedal.
Step 3. Put in screws holding master cylinder to brake pedal bracket. Torque screws to 19 lb. ft. (26 Nm).

NOTE

If adjustment of brake light switch is not required, skip step 4 and go to step 5.

Step 4. Screw brake light switch in or out to obtain a bottom height of 0.17 to 0.21 in. (4.5 to 5.5 mm). Tighten lock nut.



BOTTOM HEIGHT
0.17 TO 0.21 *in.*
(4.5 TO 5.5 *mm*)

Step 5. Put brake pedal assembly in place. Put in screws. Put on washers and nuts and torque to 19 lb. ft. (26 Nm).
Step 6. Using location tags connect electrical wires to brake light switch and warning valve switch.
Step 7. Put brake lines in place and tighten fittings.
Step 8. Bleed brake system. Refer to paragraph 3-101.
Step 9. Check brake operation.

3-101. BLEED HYDRAULIC BRAKE SYSTEM.

Step 1. Fill brake fluid reservoir to max mark. Refer to LO 9-2350-272-12 for correct brake fluid.
Step 2. Fill a one pint clean transparent container half full of clean unused brake fluid.
Step 3. Remove engine hood and cover.
Step 4. Connect tight fitting rubber hose to brake cylinder nipple.

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Step 5. Put other end of hose in the transparent container.
Step 6. Loosen brake cylinder nipple.
Step 7. Pump brake pedal until the fluid exhausting from the hose has no air bubbles.
Step 8. Press brake pedal all the way down and close brake cylinder nipple.
Step 9. Repeat Steps 1 through 5 for the other brake cylinder.
Step 10. Check reservoir. Add brake fluid as needed.
Step 11. Check operation of brakes.
Step 12. Replace engine cover and hood.

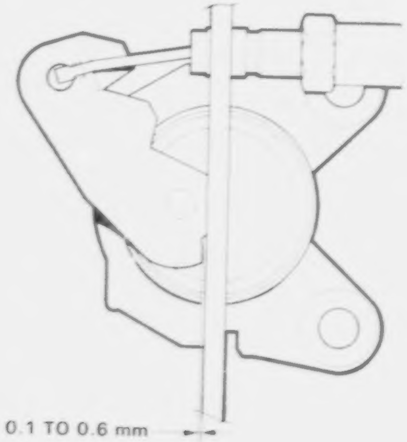
3-102. REMOVE AND REPLACE BRAKE PADS.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Remove spring clip pins from brake shoe pad retaining pin.
Step 3. Remove brake shoe pad retaining pin.
Step 4. Remove retaining clip.
Step 5. Remove deflector.
Step 6. Pull out brake shoe pads.

b. Replace.

Step 1. Using brake cylinder wrench, screw in brake piston. Refer Table 2-1, item 12 and 13.
Step 2. Put brake pads in place.
Step 3. Put deflector in place.
Step 4. Put retaining clip in place.
Step 5. Put brake shoe retaining pins in place.
Step 6. Put spring clip pins in place.
Step 7. Make sure parking brake lever is in the released position.



Step 8. Depress service brake pedal.
Step 9. Check operation of parking brake.

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NOTE

If parking brake lever rests on carrier plate, pump brake pedal several more times. Repeat Step 9. If necessary adjust parking brake. Refer to paragaph 3-108.

Step 10. Check operation of service brakes.
Step 11. Replace engine hood and cover.

3-103. REMOVE AND REPLACE BRAKE DISC.

a. Remove.

Step 1. Remove brake calipers. Refer to paragraph 3-104.
Step 2. Remove bolts and locking washers. Remove supports.
Step 3. Straighten lock plate tabs and remove brake disc screws.
Step 4. Remove brake disc. Use extractor screws, if necessary.

b. Replace.

NOTE

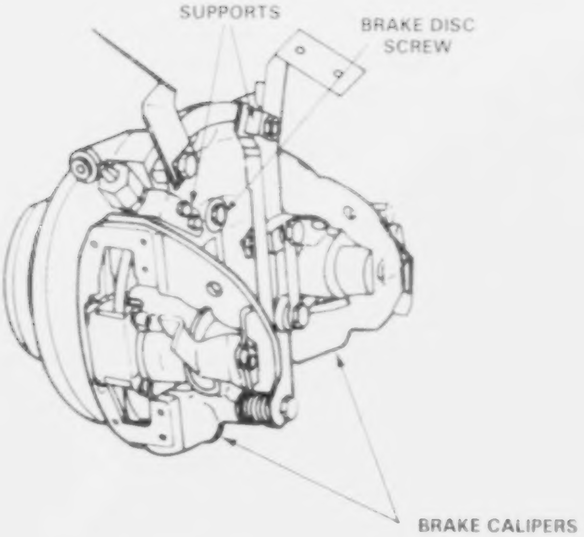
Side of brake disc marked A must face toward brake shaft.

Step 1. Clean and put brake disc in place.
Step 2. Put lockplate and screws in place. Torque screws to 39 lb. ft. (52.5 Nm).
Step 3. Put supports in place with flat side toward center of brake unit.
Step 4. Put heat shield brackets in place.
Step 5. Put in screws with locking tabs.

NOTE

Make sure brake disc is seated properly.

Step 6. Replace calipers. Refer to paragraph 3-104.
Step 7. Put support in place. Put on and tighten bolts and washers.



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3-104. REMOVE AND REPLACE CALIPERS.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Disconnect brake line at both ends. Slide the lines out of the way.
Step 3. Plug openings.
Step 4. Remove parking brake cable.
Step 5. Remove caliper mounting screws.
Step 6. Remove caliper.

b. Replace.

Step 1. Put brake caliper in place.
Step 2. Put lockplates and screws in place. Torque screws to 107 lb. ft. (145 Nm).
Step 3. Bend tabs on lockplate to secure screws.
Step 4. Connect brake lines.
Step 5. Connect parking brake cable.
Step 6. Bleed brake system. Refer to paragraph 3-101.
Step 7. Check operation of parking brake, adjust if necessary. Refer to paragraph 3-108.
Step 8. Check operation of service brakes.
Step 9. Replace engine hood and cover.

3-105. REMOVE AND REPLACE BRAKE LINES.

NOTE

Removing and replacing of all brake lines are similiar. Use this procedure as a guide.

a. Remove.

Step 1. Put a piece of plastic tape over the vent in reservoir filler cap.
Step 2. Disconnect fittings on both ends of brake line.
Step 3. Remove all fasteners.
Step 4. Remove brake lines.

b. Replace.

Step 1. Put brake lines in place.
Step 2. Connect both ends of brake line.
Step 3. Put on and secure all fasteners.
Step 4. Check routing of line. Make sure it is not crimped or rubbing.
Step 5. Bleed brakes. Refer to paragraph 3-101.
Step 6. Check for leaks.
Step 7. Check operation of brakes.

3-106. REMOVE AND REPLACE PARKING BRAKE CABLE.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Remove battery box cover and disconnect batteries.
Step 3. Remove spring clip at the pedal unit.
Step 4. Disconnect cable from lever on pedal unit.
Step 5. Disconnect cable from lever on brake caliper.
Step 6. Disconnect cable assembly from mounting bracket.
Step 7. Remove wire ties.
Step 8. Pull cable through bushing.
Step 9. Remove side panels.
Step 10. Remove cable assembly.

b. Replace.

Step 1. Put cable assembly in place.
Step 2. Connect cable assembly at mounting bracket and brake caliper.
Step 3. Connect cable to brake lever on caliper.
Step 4. Connect cable assembly to pedal unit. Secure with spring clip.
Step 5. Connect cable to lever.
Step 6. Put on wire ties.
Step 7. Put on side panels.
Step 8. Adjust cable length. Refer to paragraph 3-108.
Step 9. Check parking brake operation.
Step 10. Replace engine hood and cover.

3-107. REMOVE AND REPLACE PARKING BRAKE PEDAL.

a. Remove.

Step 1. Remove spring clip. Disconnect cable.
Step 2. Unscrew knob. Pull knob out of bracket.
Step 3. Tag and disconnect electrical wires.
Step 4. Remove mounting nuts and mount.
Step 5. Remove pedal unit.

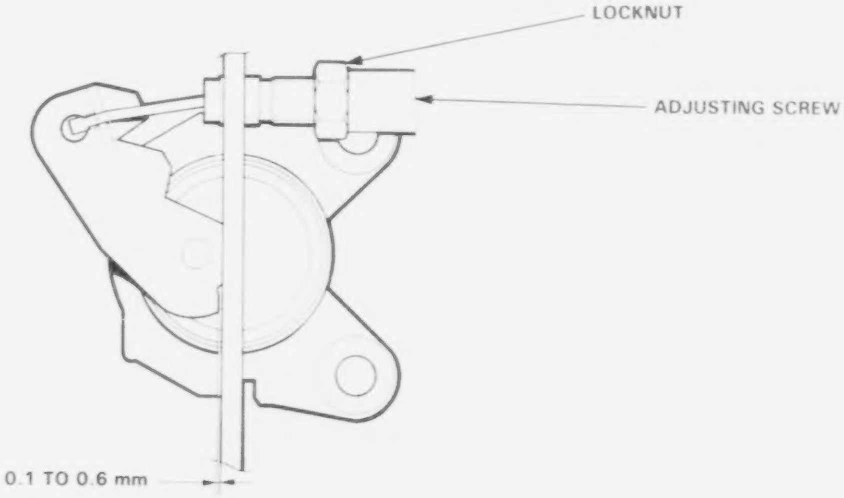
b. Replace.

Step 1. Put pedal unit in place.
Step 2. Put in screws and lock tabs.
Step 3. Put arm in place and screw on knob.
Step 4. Using location tags, connect electrical wires.
Step 5. Connect cable. Put spring clip in place.
Step 6. Check operation of parking brake.
Step 7. Check parking brake indicator.

3-108. ADJUST PARKING BRAKE CABLE.

a. Remove

Step 1. Remove engine hood and cover.
Step 2. Release parking brake.
Step 3. Check cable assembly to insure it is connected securely to pedal unit.
Step 4. Loosen lock nut at brake caliper.
Step 5. Turn adjusting screw until a clearance of .004 to .024 in. (0.1 to 0.6 mm) is obtained.
Step 6. Tighten lock nut.
Step 7. Check operation of parking brake.
Step 8. Replace engine hood and cover.

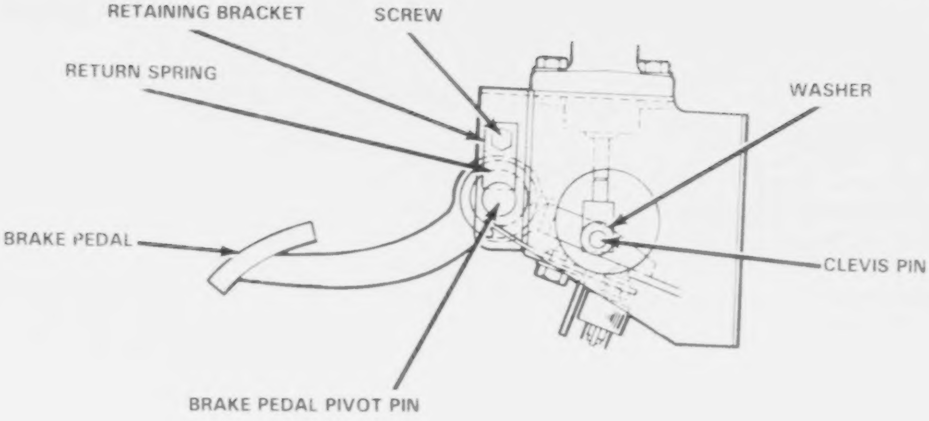


3-109. REMOVE AND REPLACE BRAKE PEDAL.

a. Remove.

Step 1. Remove cotter pin, washer and clevis pin.
Step 2. Remove screw from retaining bracket. Remove bracket.
Step 3. Observe brake pedal return spring. Push out brake pedal pivot pin. Remove brake pedal and return spring.

TA259275


RETAINING BRACKET
SCREW
RETURN SPRING
WASHER
BRAKE PEDAL
CLEVIS PIN
BRAKE PEDAL PIVOT PIN

b. **Replace.**

Step 1. Put brake pedal with return spring in place. Put in pivot pin.
Step 2. Align push rod clevis with brake pedal. Put in clevis pin. Put on washer and put in cotter pin.
Step 3. Check operation of brakes and brake light.

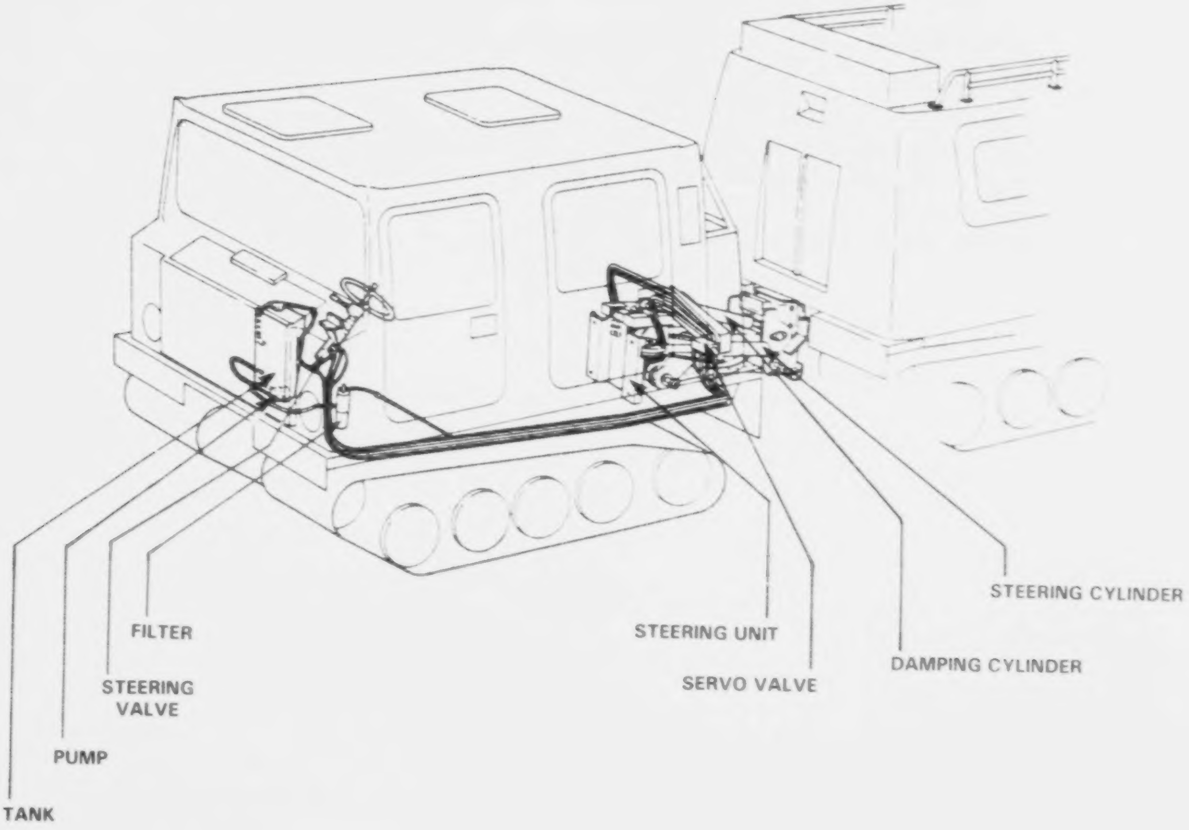
TA259276

Section VI. STEERING SYSTEM MAINTENANCE INSTRUCTIONS

Design and function

The carrier is fitted with a hydraulic steering system comprising the following components: hydraulic oil tank, pump, steering valve with steering shaft, servo valve, steering cylinders, hydraulic lines, and a steering mechanism with damping cylinder.

The steering cylinders are hydraulically actuated by the pump and steering valve. The design of the steering unit ensures that the two cars will track perfectly when cornering.

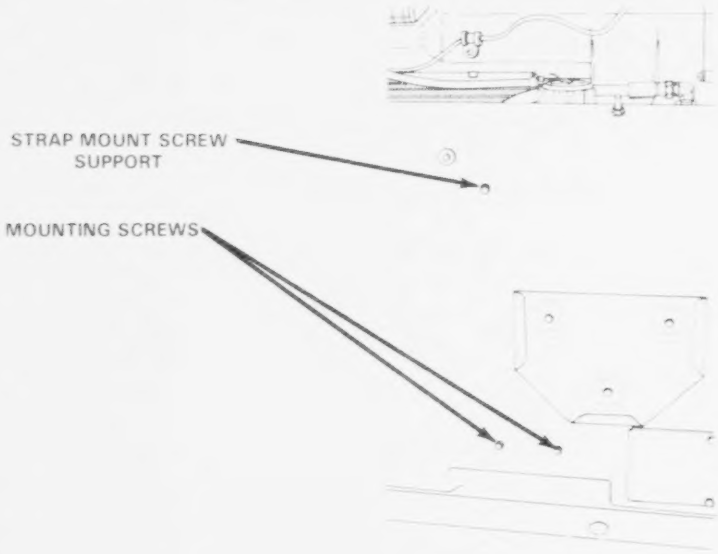

STEERING CYLINDER
FILTER
STEERING UNIT
DAMPING CYLINDER
STEERING VALVE
SERVO VALVE
PUMP
TANK

TA259277

3-110. REMOVE AND REPLACE STEERING HYDRAULIC OIL TANK.

a. Remove.

Step 1. Clean tank and surrounding area.
Step 2. Disconnect top hydraulic hose at the body.
Step 3. Remove mounting screws and disconnect retaining strap around tank.
Step 4. Lift tank and drain fluid.
Step 5. Loosen right side tank support mounting screw.
Step 6. Loosen left side tank support mounting screw.
Step 7. Turn support down.
Step 8. Disconnect lower hydraulic hose from tank.



b. Replace.

Step 1. Make sure tank is clean inside and outside.
Step 2. Put tank in place.
Step 3. Turn tank support up to hold tank.
Step 4. Tighten support mounting screws.
Step 5. Put retaining strap in place.
Step 6. Put in mounting screw. Tighten screw.
Step 7. Connect two hydraulic hoses to tank.
Step 8. Fill tank. Refer to the LO 9-2350-272-12.

TA259278

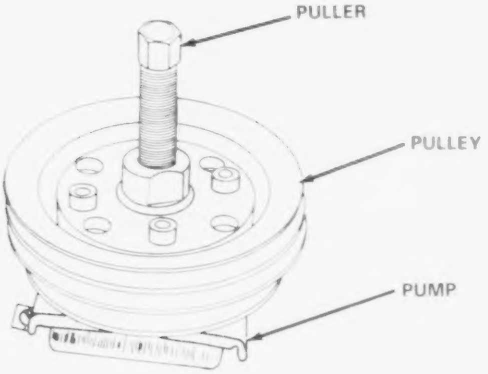
3-111. REMOVE AND REPLACE STEERING HYDRAULIC PUMP.

a. Remove.

Step 1. Drain steering hydraulic oil tank dry.
Step 2. Disconnect negative battery cable.
Step 3. Remove engine hood.
Step 4. Remove engine right side access door.
Step 5. Clean pump and surrounding area.
Step 6. Remove propeller shaft. Refer to paragraph 3-38.
Step 7. Remove nut holding pulley in place.
Step 8. Remove alternator V-belt and radiator fan V-belt. Refer to paragraph 3-4.
Step 9. Remove alternator. Refer paragraph 3-46.
Step 10. Using a puller, remove pulley from pump. Refer to Table 2-1, item 34.
Step 11. Loosen hose clamp. Pull off suction hose. Plug connections.
Step 12. Disconnect pressure hose from pump. Plug connections.
Step 13. Remove pump mounting screws.
Step 14. Remove pump.

NOTE

Do not lose woodruff key.



b. Replace.

Step 1. Put pump in place.
Step 2. Put in and tighten mounting screws.
Step 3. Connect pressure hose to pump. Tighten fitting.
Step 4. Connect suction hose to pump. Tighten clamp.
Step 5. Put woodruff key, pulley, washer and nut on pump shaft. Tighten nut.
Step 6. Replace alternator. Refer to paragraph 3-46.
Step 7. Replace alternator V-belts and radiator fan V-belts. Refer to paragraph 3-5.
Step 8. Retighten pulley nut.
Step 9. Replace engine-to-hydraulic pump propeller shaft.
Step 10. Fill hydraulic oil tank. Refer to the LO 9-2350-272-12.
Step 11. Connect negative battery cable.
Step 12. Start engine.
Step 13. Check for oil leaks.
Step 14. Check operation of steering.
Step 15. Replace engine right side access cover.
Step 16. Replace engine hood.

TA259279

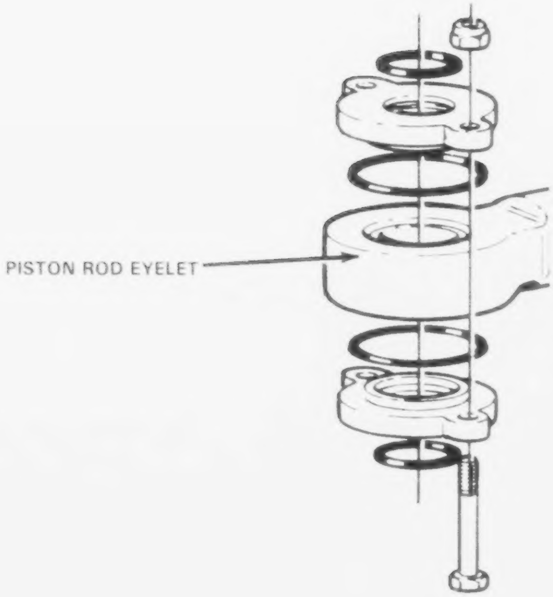
3-112. REMOVE AND REPLACE STEERING CYLINDERS.

a. Remove.

NOTE

Both steering cylinders are removed the same way.

Step 1. Clean steering cylinder hydraulic hose connections.
Step 2. Tag and remove hoses. Plug openings.
Step 3. Drive spring pin out of piston rod eyelet retaining and discard pin.
Step 4. Using a puller, press out the piston rod eyelet retaining pin. See Table 2-1, item 33.
Step 5. Remove screws, nuts, and bearing covers of cylinder pivot mounting.
Step 6. Remove steering cylinder.



TA259280

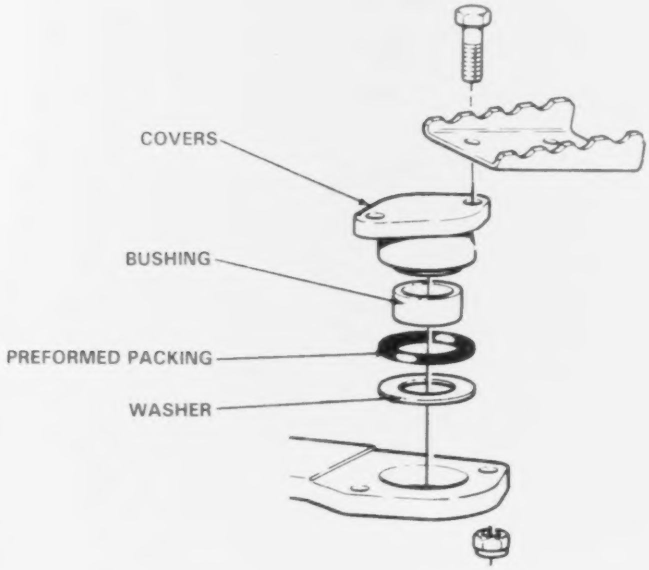
b. Replace.

Step 1. Put new preformed packing on cylinder eyelet and in cylinder covers.
Step 2. Put cylinder covers in place.
Step 3. Put in screws. Put on and tighten nut.
Step 4. Use drift pin. See table 2-1, item 35. Put new bushings for cylinder journals in place. Grease bushings.
Step 5. Put new preformed packing and washer in place.
Step 6. Put cylinder in place.

CAUTION

Steering unit guard must be properly positioned or damage to equipment will result. Short end of step goes toward front car.

Step 7. Put cylinder covers and steering unit guard in place on pivots.
Step 8. Put in screws. Put on and tighten nuts.
Step 9. Put piston rod eyelet in place.
Step 10. Place a spacer between piston rod eyelet and lower mounting bracket.
Step 11. Drive in piston rod eyelet retaining pin.
Step 12. Drive spring pin in piston rod eyelet pin.
Step 13. Using location tags, connect and tighten hydraulic hoses.
Step 14. Start engine.
Step 15. Turn steering wheel all the way to left, then all the way to the right to bleed cylinder of air.
Step 16. Check connections for leaks.

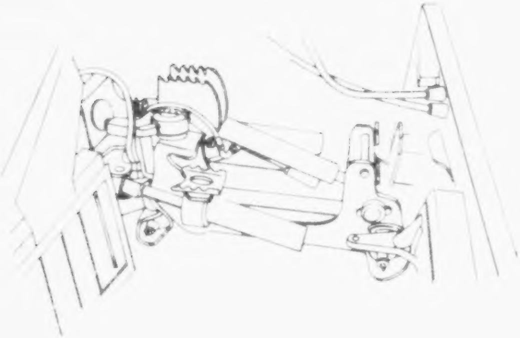


TA259281

3-113. REMOVE AND REPLACE HYDRAULIC STEERING DAMPING MECHANISM.

a. Remove.

Step 1. Loosen valve stem. Drain air from accumulator.
Step 2. Remove accumulator mounting screws. Lift accumulator.
Step 3. Remove two screws. Remove rubber buffer plate.
Step 4. Remove nut from front of damping cylinder mounting.
Step 5. Remove nut from damping cylinder piston rod.
Step 6. Remove the screw mounting damping cylinder.
Step 7. Remove screw of piston rod mounting.
Step 8. Remove damping cylinder with accumulator.



b. Disassembly.

Step 1. Disconnect hydraulic hose from accumulator. Remove accumulator.
Step 2. Remove two hollow screws. Remove hoses with throttle valve.

TA259282

c. Assembly.

Step 1. Pull out piston rod of dampening cylinder as far as it will go.
Step 2. Fill both ends of dampening cylinder with oil. Refer to LO 9-2350-272-12 for proper oil.

NOTE

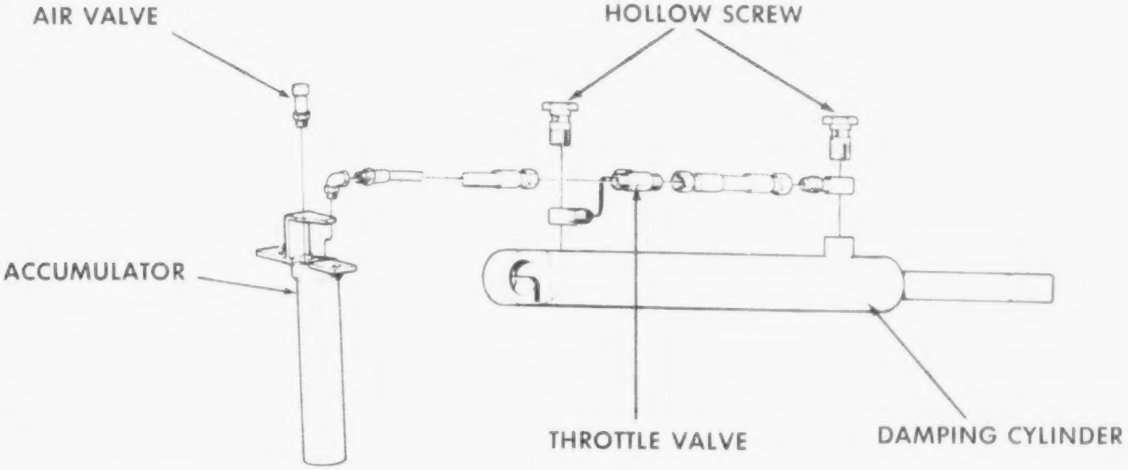
Hollow screws have different sized orifices. Make sure they are mounted in the proper position.

Step 3. Put hydraulic hose with throttle valve in place. Put in and tighten two hollow screws.
Step 4. Fill hydraulic hoses and accumulator with oil, connect hose to accumulator.

NOTE

Accumulator must be kept vertical after pressurizing to prevent air from entering system.

Step 5. Pressurize accumulator to 87 ± 14.5 PSI (600 ± 100 KPA).
Step 6. Loosen hydraulic hose between accumulator and throttle valve slowly. Bleed accumulator until oil flows with no air bubbles. Tighten hydraulic hose.
Step 7. Loosen valve stem. Drain air from accumulator.
Step 8. Remove air valve. Drain oil from accumulator until level is 2.0 to 2.8 in. (50 to 70 mm).
Step 9. Put in and tighten air valve. Tighten valve stem.



d. Replace.

Step 1. Put accumulator in place.
Step 2. Put in and tighten mounting screws.
Step 3. Put piston rod eye in place.
Step 4. Put in screw. Put on and tighten nut.
Step 5. Loosen valve stem.
Step 6. Compress cylinder and put it in place.
Step 7. Put in screw. Put on and tighten nut.
Step 8. Tighten valve stem. Pressurize accumulator 87 ± 14.5 PSI (600 ± 100 KPA)
Step 9. Put on rubber buffer plate.

TA259283

3-114. REMOVE AND REPLACE STEERING OIL FILTER.

a. Remove.

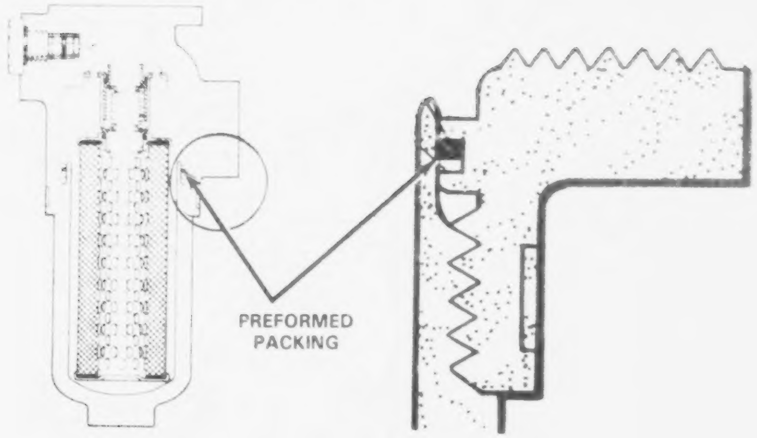
Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Remove engine left side access cover.
Step 3. Clean housing and surrounding area.
Step 4. Unscrew filter bowl. Remove bowl with filter.
Step 5. Remove filter and dump oil from bowl.
Step 6. Remove gaskets from housing.

b. Replace.

NOTE

The backing ring must be placed under the performed packing.

Step 1. Put new preformed packing in housing.
Step 2. Break seal of plastic bag but do not remove filter cartridge.
Step 3. Grip plastic bag and press cartridge into place. Remove bag.
Step 4. Screw filter bowl into filter housing. Torque bowl to 177 lb. in. (20 Nm).
Step 5. Operate steering left to right several times to bleed air from system. Check for correct operation and leaks.
Step 6. Add steering oil as necessary. Refer to LO 9-2350-272-12 for proper grade of oil.
Step 7. Replace left access cover.
Step 8. Replace power pack. Refer to paragraph 3-2.



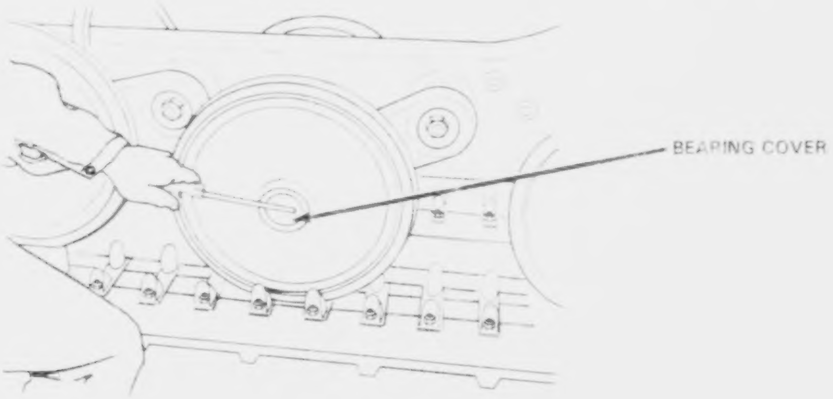
TA259284

Section VII. SUSPENSION SYSTEM MAINTENANCE INSTRUCTIONS

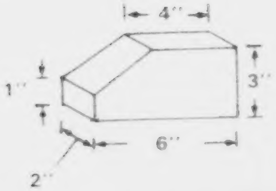
3-115. REMOVE AND REPLACE WHEEL ASSEMBLY.

a. Remove.

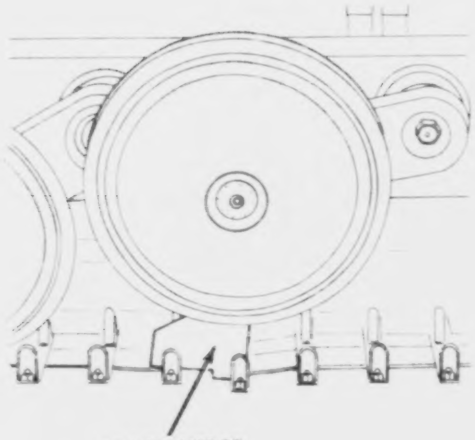
Step 1. Remove bearing cover.



Step 2. Place track wedge in front of wheel on the opposite side of track girder.
Step 3. Move carrier forward so that wheel is standing on track wedge. Set parking brake.

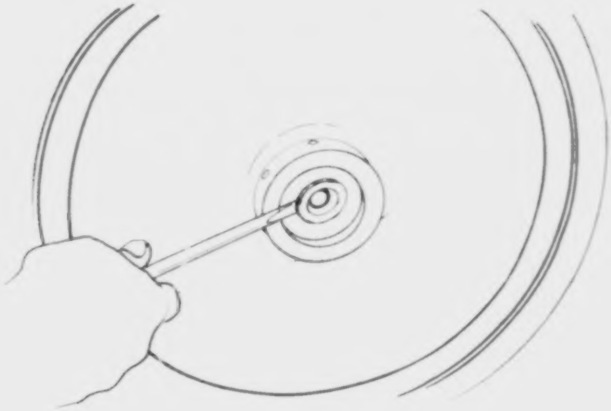


WOODEN TRACK WEDGE



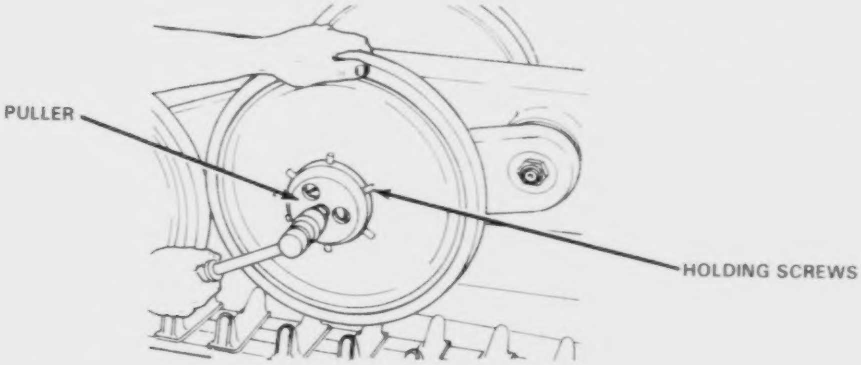
TA259285

Step 4. Remove center screw and washer holding wheel on shaft.



Step 5. Center puller on wheel. Screw in and tighten holding screws. See Table 2-1, item 25.

Step 6. Using puller, remove wheel.

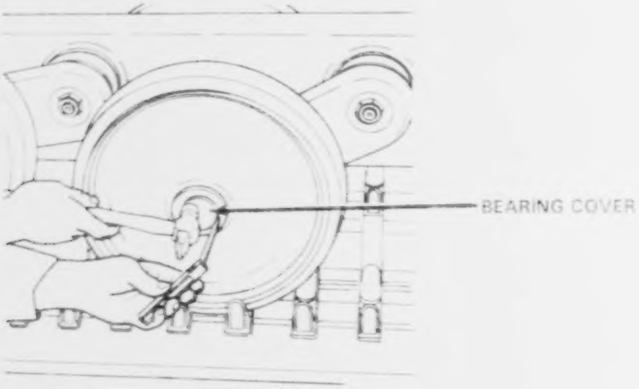


Step 7. Remove wear ring, if installed.

TA259286

b. Replace.

Step 1. Clean shaft and surrounding area. Put sealant on sealing surface.
Step 2. Put on new wear ring.
Step 3. Put wheel on shaft.
Step 4. Put in washer and center screw. Torque screw to 59 lb. ft. (80 Nm).
Step 5. Using 0.50 mm feeler gage and hammer, tap in bearing cover.

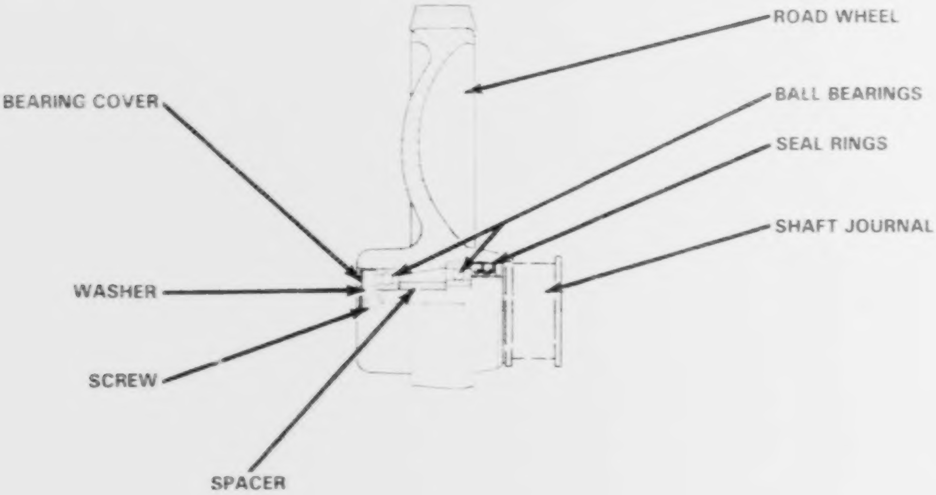

BEARING COVER

Step 6. Move carrier backward. Remove track wedge.

3-116. REMOVE AND REPLACE WHEEL BEARINGS.

a. Remove.

Step 1. Remove wheel.
Step 2. Tap out spacer and outer ball bearing and remove spacer.
Step 3. Tap out seals and inner ball bearing.


ROAD WHEEL
BEARING COVER
BALL BEARINGS
SEAL RINGS
SHAFT JOURNAL
WASHER
SCREW
SPACER

TA259287

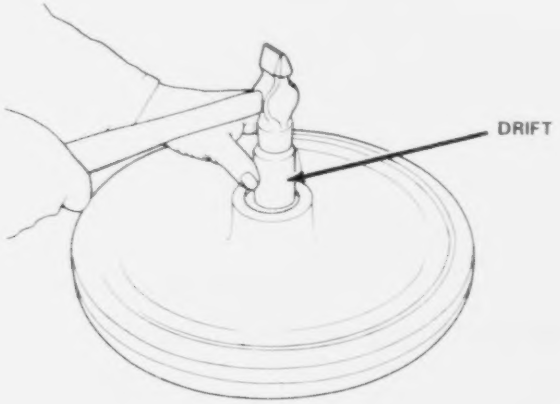
WARNING

Cleaning solvent, federal specification P-D-680, TYPE II, is flammable and gives off harmful vapors. Use solvent only in well-ventilated area. Avoid prolonged breathing of solvent vapor. Keep solvent away from flame. Do not use solvent in excessive amounts.

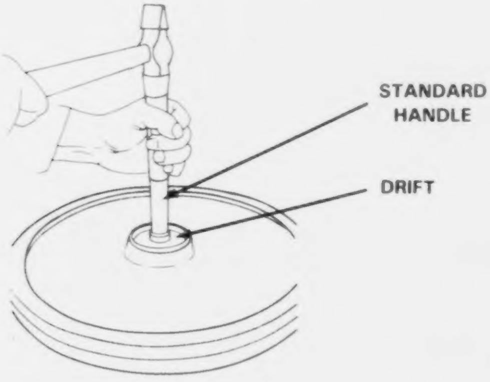
Step 4. Clean wheel hub with solvent. Wipe dry.

b. Replace.

Step 1. Pack bearing with grease. Refer to LO 9- 2350-272-12 for correct grease.
Step 2. Using drift, drive outer bearing in wheel. See Table 2-1, item 32.

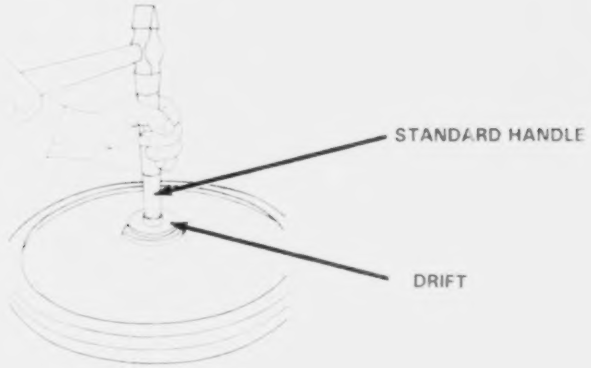


Step 3. Pack space between bearing ¾ full of grease.
Step 4. Put spacer in place.
Step 5. Using drift and standard handle, drive inner bearing in wheel. See Table 2-1, item 31 and 5.



TA259288

Step 6. Pack grease under lip of seal.
Step 7. Use drift and standard handle. Drive seals in place. See Table 2-1, item 24 and 5.

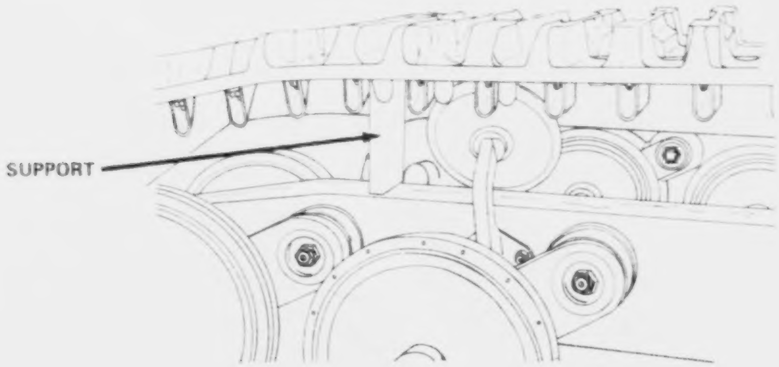


Step 8. Install wheel on carrier. Refer to paragraph 3-115.

3-117. REMOVE AND REPLACE SUPPORT WHEEL.

a. Remove.

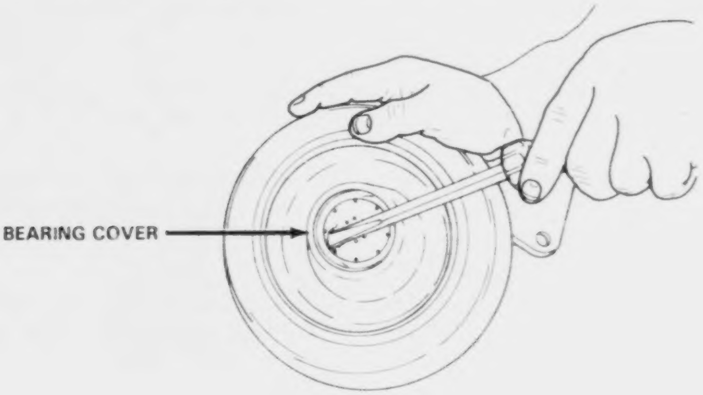
Step 1. Release track tension.
Step 2. Raise track and support weight off support wheel.



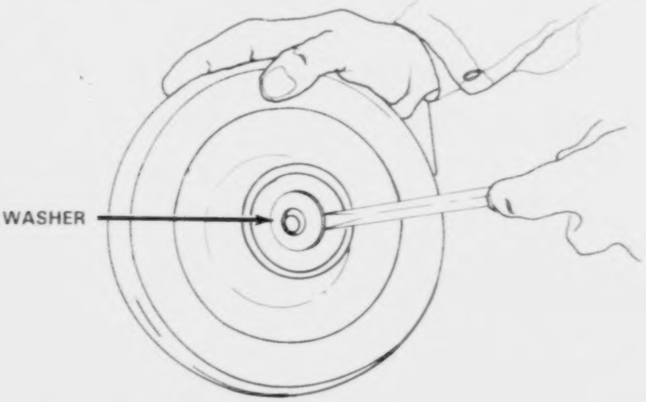
TA259289

Step 3. Remove support wheel bracket and wheel.

Step 4. Remove suport wheel bearing cover.


BEARING COVER

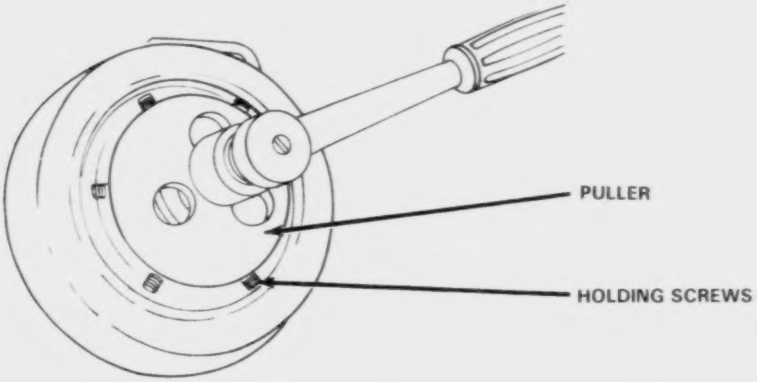
Step 5. Remove center screw and washer holding support wheel to mounting bracket.



Step 6. Center puller on support wheel. Screw in and tighten holding screws. See Table 2-1, item 25.

Step 7. Using puller, remove support wheel from mounting bracket.

Step 8. Remove wear ring if installed.


PULLER
HOLDING SCREWS

TA259290

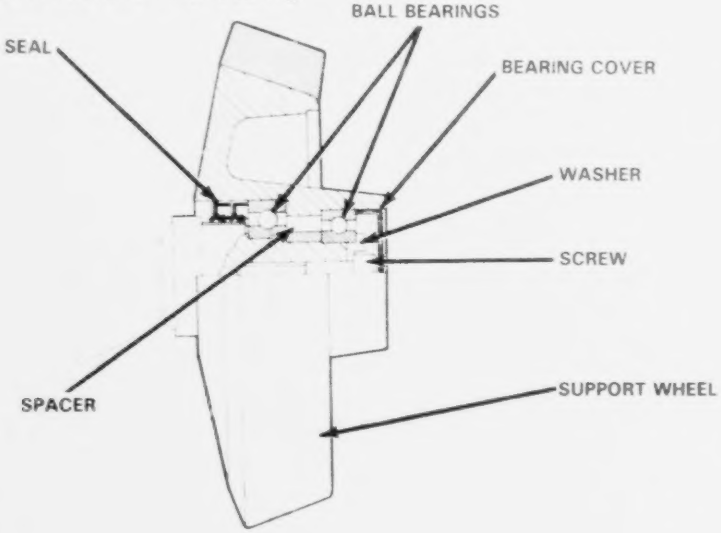
b. Replace.

Step 1. Clean shaft. Put sealant on sealing surface.
Step 2. Put on new wear ring.
Step 3. Put support wheel on mounting bracket shaft.
Step 4. Put washer and center screw in place. Torque screw to 59 lb. ft. (80 Nm).
Step 5. Using hammer and 0.50 mm feeler gage, tap in bearing cover.
Step 6. Put support wheel bracket with support wheel in place.
Step 7. Put in screws. Put on and tighten nuts.
Step 8. Remove support from track.
Step 9. Adjust track tension. Refer to TM 9-2350-272-10.

3-118. REMOVE AND REPLACE SUPPORT WHEEL BEARINGS.

a. Remove.

Step 1. Remove support wheel.
Step 2. Tap out spacer and outer bearing.
Step 3. Tap out seals and inner bearing.



TA259291

WARNING

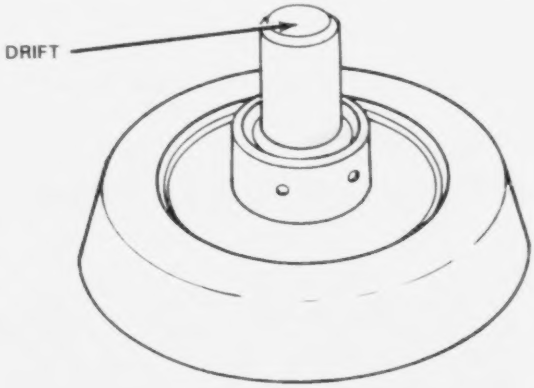
Cleaning solvent, federal specification P-D-680, TYPE II, is flammable and gives off harmful vapors. Use solvent only in well-ventilated area. Avoid prolonged breathing of solvent vapors. Keep solvent away from flame. Do not use solvent in excessive amounts.

Step 4. Clean wheel hub with solvent. Wipe dry.

b. Replace.

Step 1. Pack bearings with grease. Refer to LO 9- 2350-272-12 for correct grease.

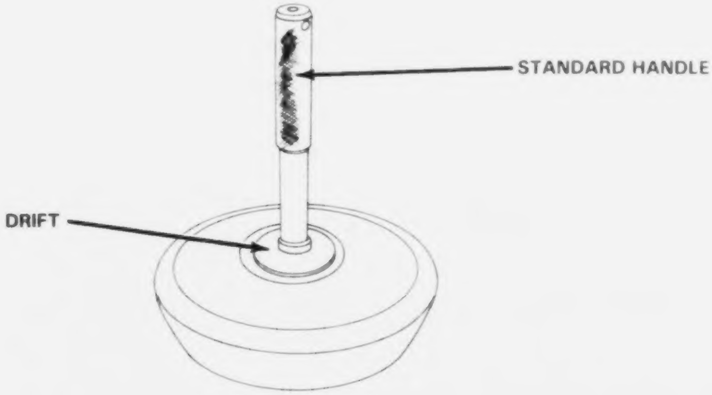
Step 2. Use drift. Drive outer bearing in wheel. See Table 2-1, item 32.



Step 3. Pack space between bearings with grease.

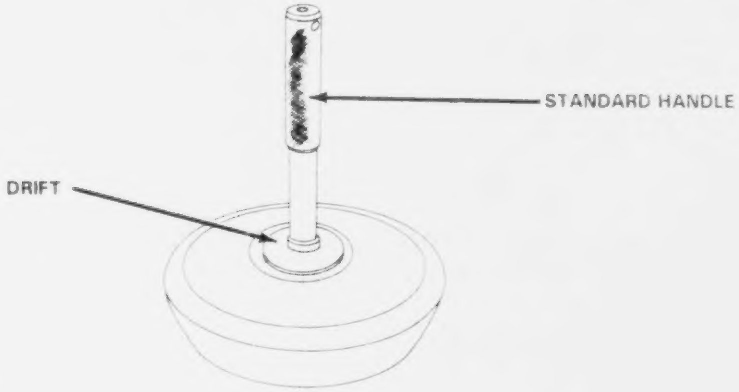
Step 4. Put spacer in place.

Step 5. Use drift and standard handle. Drive outer bearing in wheel. See Table 2-1, items 31 and 5.



TA259292

Step 6. Pack grease under lip of seal.
Step 7. Using drift and standard handle, drive seal in place. See Table 2-1, items 24 and 5.

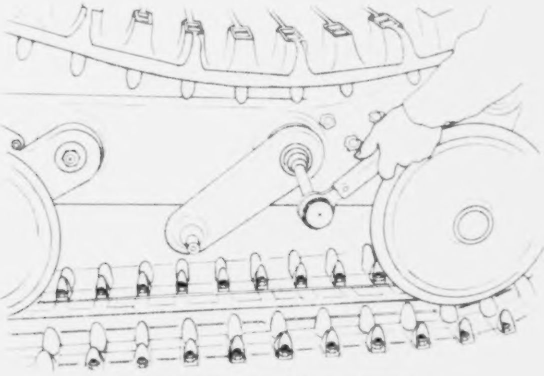


Step 8. Install wheel on carrier.

3-119. REMOVE AND REPLACE PIVOT ARM ASSEMBLY.

a. Remove.

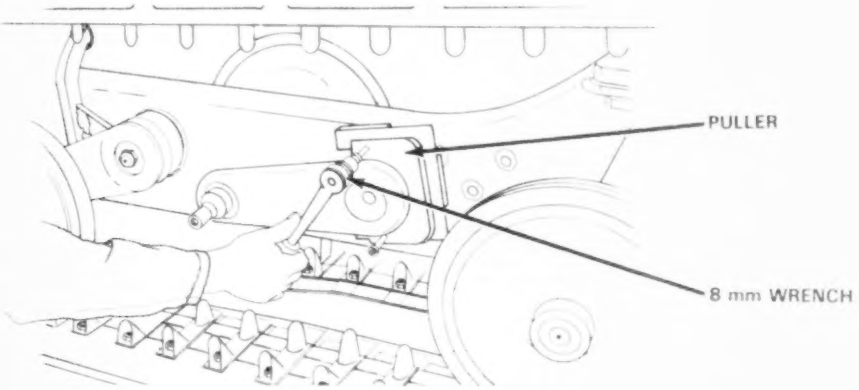
Step 1. Remove wheel.
Step 2. Remove nut and screw holding arm assembly in torsion springs.



REMOVING NUT AND SCREW

TA259293

Step 3. Mark angle of pivot arm.
Step 4. Using puller and wrench, remove pivot arm. See Table 2-1, items 20 and 34.



REMOVING PIVOT ARM

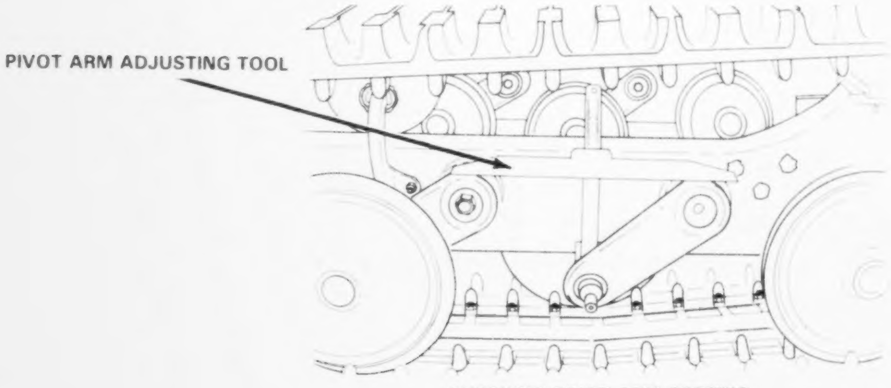
NOTE

Pivot arms are marked A or B.

Step 5. Record pivot arm marking.

b. Replace.

Step 1. Using pivot arm angle mark, put pivot arm in place.
Step 2. Using adjusting tool, check setting. See Table 2-1, item 21 and 23. See pivot arm setting chart.
Step 3. Replace wheel.



CHECKING PIVOT ARM SETTING

TA259294

3-120. ADJUST PIVOT ARM.

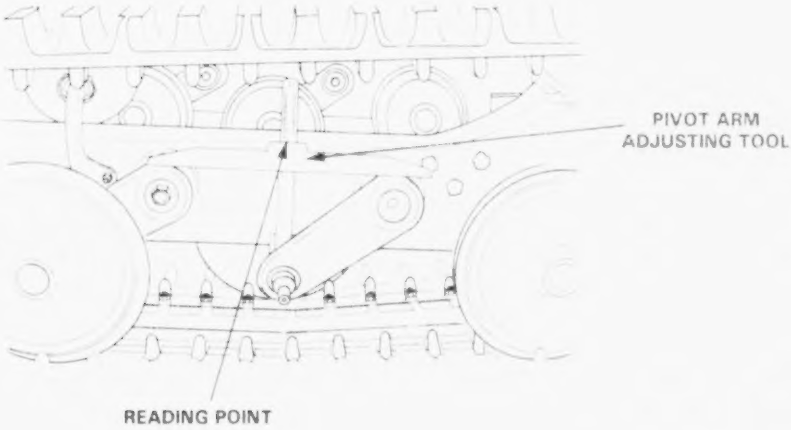
Pivot arms are installed in pairs. One arm is marked A. The other arm is marked B. Both arms will fit in either side of the torsion spring, but you can not get the proper angle when installing them in the wrong side. To determine which arm goes in the inside or outside of the torsion spring, use the procedures and chart below.

NOTE

Use the mark made during removal to install the pivot arm. If installing new arm, put the pivot arm in at the same angle as the other pivot arms.

Step 1. Put pivot arm in place.

Step 2. Using pivot arm adjusting tool, check and record angle. See Table 2-1, item 28 and 30.



Step 3. Pull pivot arm out far enough to disengage splines. Turn arm up one spline. Push arm in.

Step 4. Using pivot arm adjusting tool, check and record angle.

Step 5. Pull pivot arm out far enough to disengage splines. Turn arm down two splines. Push arm in.

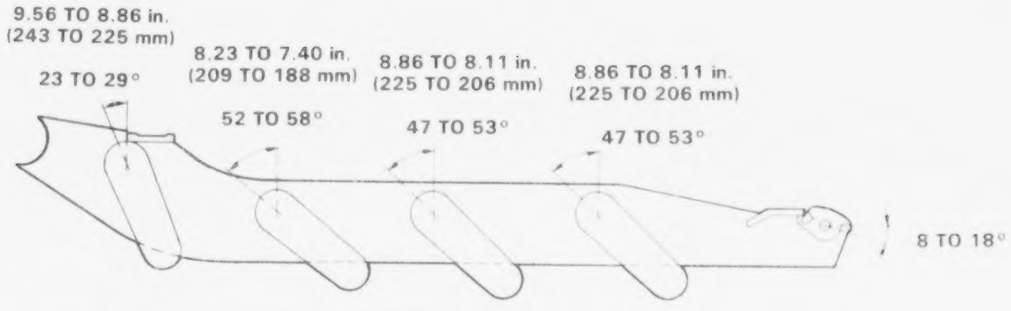
Step 6. Using pivot arm adjusting tool, check and record angle.

Step 7. Pull pivot arm out of torsion spring.

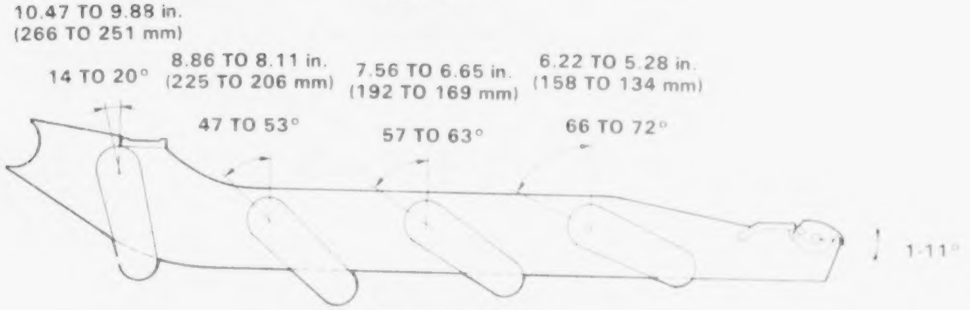
Step 8. Repeat procedures steps 1-7 on the other side of torsion spring.

Step 9. Compare readings recorded with readings on chart below for arm being replaced. Determine if the arm goes inside or outside of the torsion spring.

TA259295

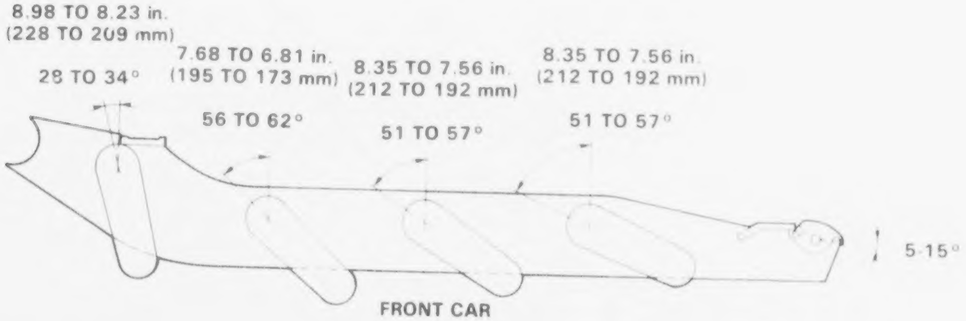

9.56 TO 8.86 in.
(243 TO 225 mm)
23 TO 29°
8.23 TO 7.40 in.
(209 TO 188 mm)
52 TO 58°
8.86 TO 8.11 in.
(225 TO 206 mm)
47 TO 53°
8.86 TO 8.11 in.
(225 TO 206 mm)
47 TO 53°
8 TO 18°

FRONT CAR

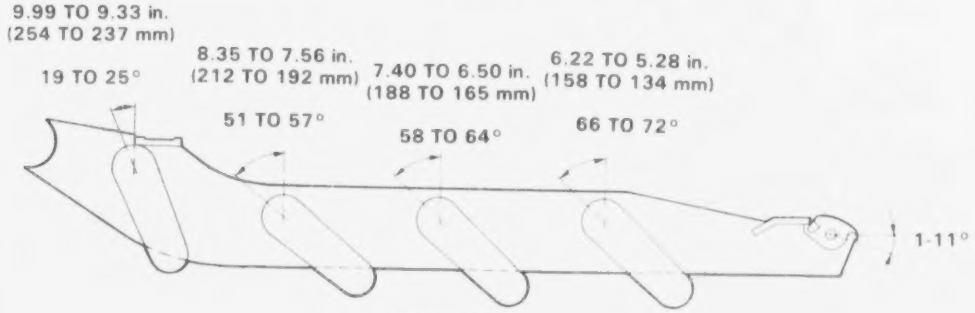

10.47 TO 9.88 in.
(266 TO 251 mm)
14 TO 20°
8.86 TO 8.11 in.
(225 TO 206 mm)
47 TO 53°
7.56 TO 6.65 in.
(192 TO 169 mm)
57 TO 63°
6.22 TO 5.28 in.
(158 TO 134 mm)
66 TO 72°
1-11°

REAR CAR

Swing arm settings and cam angles for pre-tensioning torsion springs, for cars driven less than 300 miles (500 km)


8.98 TO 8.23 in.
(228 TO 209 mm)
28 TO 34°
7.68 TO 6.81 in.
(195 TO 173 mm)
56 TO 62°
8.35 TO 7.56 in.
(212 TO 192 mm)
51 TO 57°
8.35 TO 7.56 in.
(212 TO 192 mm)
51 TO 57°
5-15°

FRONT CAR


9.99 TO 9.33 in.
(254 TO 237 mm)
19 TO 25°
8.35 TO 7.56 in.
(212 TO 192 mm)
51 TO 57°
7.40 TO 6.50 in.
(188 TO 165 mm)
58 TO 64°
6.22 TO 5.28 in.
(158 TO 134 mm)
66 TO 72°
1-11°

REAR CAR

Swing arm setting angles and cam angles for pre-tensioning torsion springs, for cars driven more than 300 miles (500 km)

TA259296

Step 10. Using pivot arm setting tool, put arm on the correct side of torsion spring. Make sure angle is correct.

NOTE

If the arm put in place was marked A, use an arm marked B on the other side of torsion spring. If the arm put in place was marked B, put arm marked A on the other side of torsion spring.

Step 11. Using pivot arm adjustig tool, put the other pivot arm in place. Make sure angle is correct.

Step 12. Put in screw. Put on nut. Torque nut to 295 lb. ft. (400 Nm).

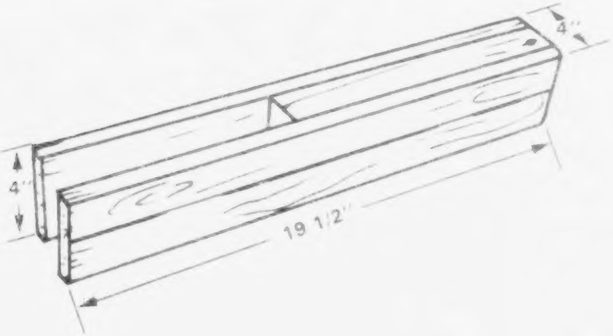
3-121. REMOVE AND REPLACE SPROCKET.

a. Remove.

Step 1. Remove cotter pins, nuts and screws holding track tensioner in its operating position.

Step 2. Raise and support carrier. Push tension wheels down and forward.

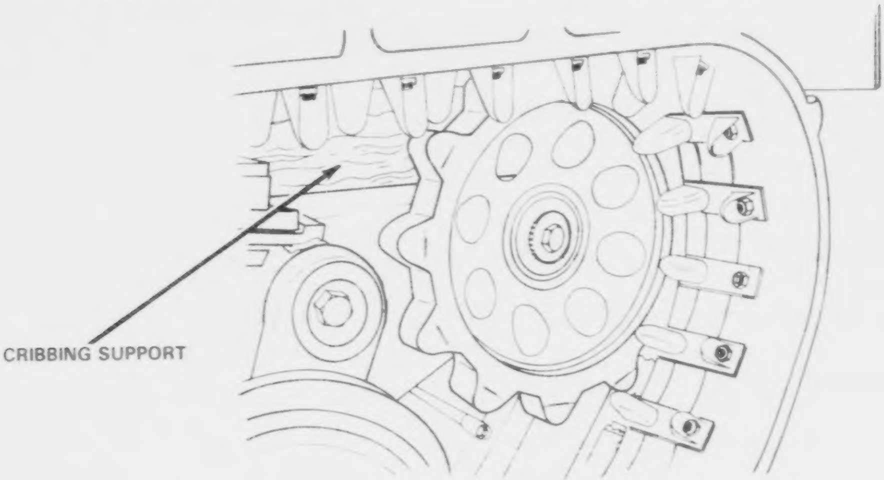
Step 3. Locate a piece of cribbing, 4" × 4" × 19 1/2" (approximately 100 × 100 × 500 mm).



TA259297

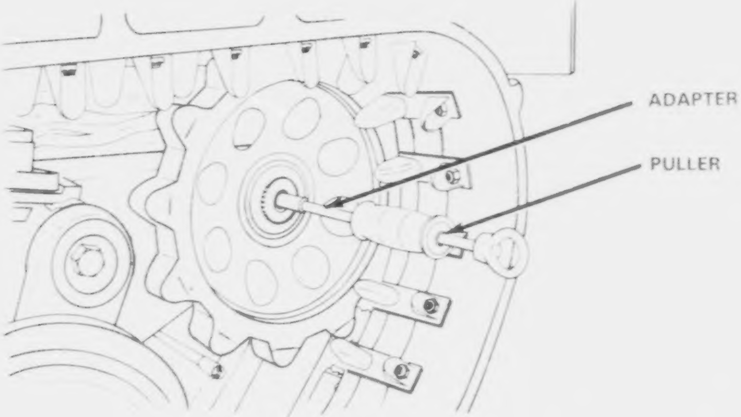
Step 4. Remove grease nipple from sprocket housing. Plug opening.

Step 5. Put cribbing between track and sprocket housing.



Step 6. Remove center screw from sprockets.

Step 7. Using the puller and adapter, remove splined shaft. See Table 2-1, items 19 and 22.



REMOVING SPLINED SHAFT

Step 8. Remove sprockets.

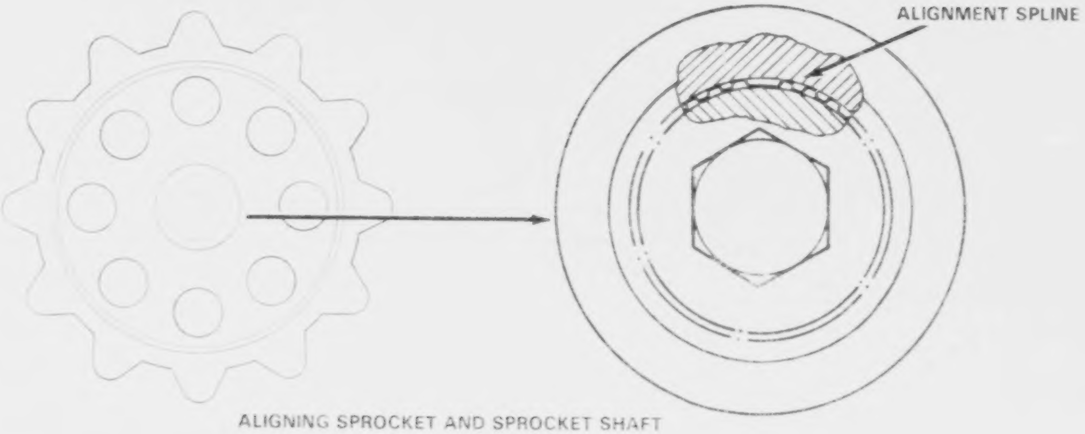
b. Replace.

NOTE

The sprocket has one oversized spline. The sprocket shaft has one oversize index space. When they are aligned the sprockets are properly installed.

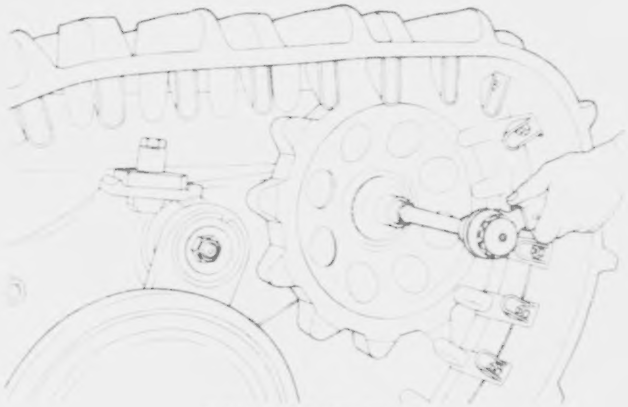
TA259298

Step 1. Put sprockets in place, align and put in shaft.



ALIGNING SPROCKET AND SPROCKET SHAFT

Step 2. Put center screw and washer in place.
Step 3. Put differential-to-drive sprocket propeller shaft in place.
Step 4. Tighten center screw. Torque to 259 lb. ft. (350 Nm).



TIGHTENING CENTER SCREW

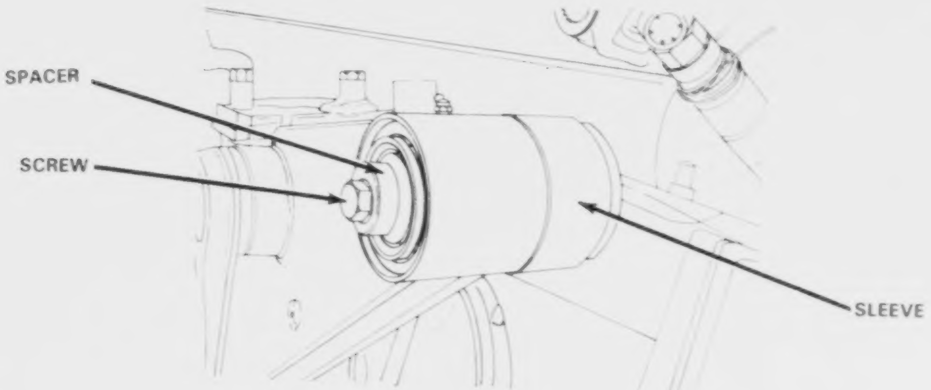
Step 5. Remove cribbing support.
Step 6. Put track tensioner in place. Lower vehicle.
Step 7. Put screws, and nuts in track tensioner. Tighten nuts.
Step 8. Put in cotter pins.
Step 9. Replace grease nipple.
Step 10. Check track tension. Adjust as necessary. Refer to TM 9-2350-272-10.

TA259299

3-122. REMOVE AND REPLACE SPROCKET BEARINGS.

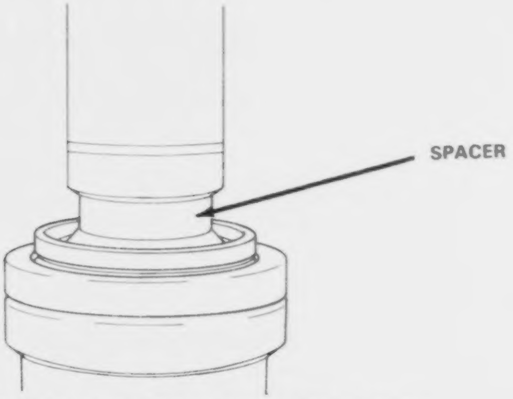
a. Remove.

Step 1. Remove sprockets. Refer to paragraph 3-121.
Step 2. Remove cribbing support.
Step 3. Lift track off front end.
Step 4. Secure propeller shaft out of way.
Step 5. Remove inner and outer V-rings.
Step 6. Using the sleeve and spacer with center screw, remove hub inner ball bearing, wear ring and seal. Refer to Table 2-1, items 27 and 29.



REMOVING HUB INNER BALL BEARING WEAR RING AND SEAL

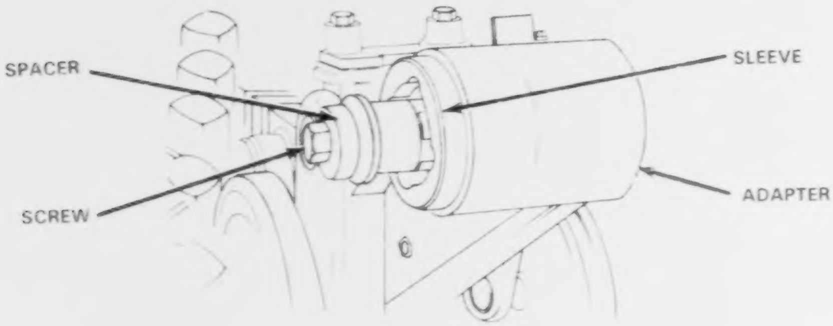
Step 7. Using the spacer and a suitable solid surface, remove hub from wear ring, seal and ball bearing. Refer to Table 2-1, item 27.



REMOVING HUB FROM WEAR RING SEAL AND BALL BEARING

TA259300

Step 8. Using a center screw, spacer, sleeve and adapter, remove outer ball bearing, wear ring and seal. See Table 2-1, items 26, 27 and 29.

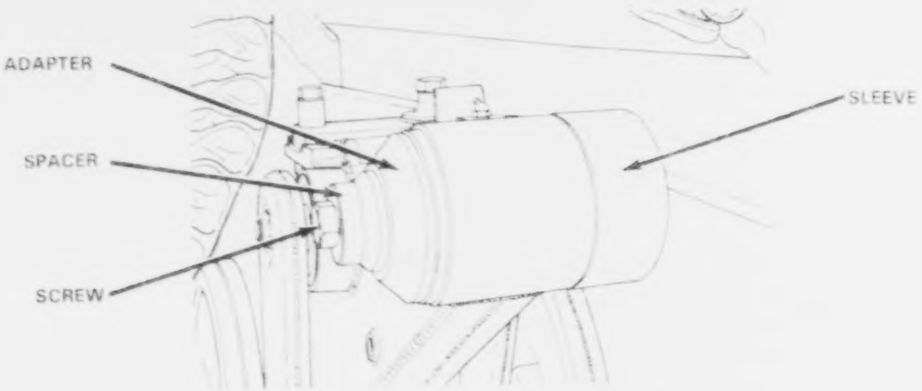

SPACER
SLEEVE
ADAPTER
SCREW

REMOVING OUTER BALL BEARING WEAR RING AND SEAL

b. Replace.

Step 1. Pack ball bearings with grease and press on hub and assemble. Refer to LO 9-2350-272-12 for correct grease.

Step 2. Use sleeve, adapter, spacer and center screw. See Table 2-1, items 27, 28 and 29. Press outer bearing in track girder housing.

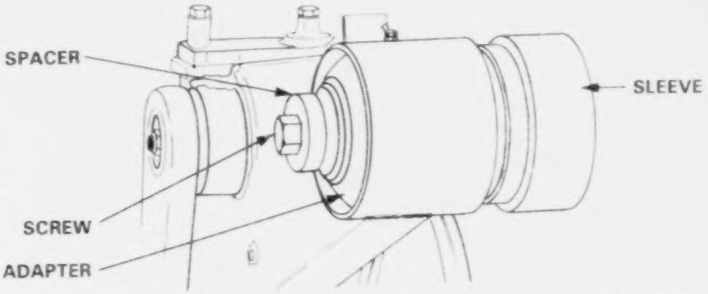

ADAPTER
SLEEVE
SPACER
SCREW

PRESSING OUTER BALL BEARING IN TRACK GIRDER HOUSING

TA259301

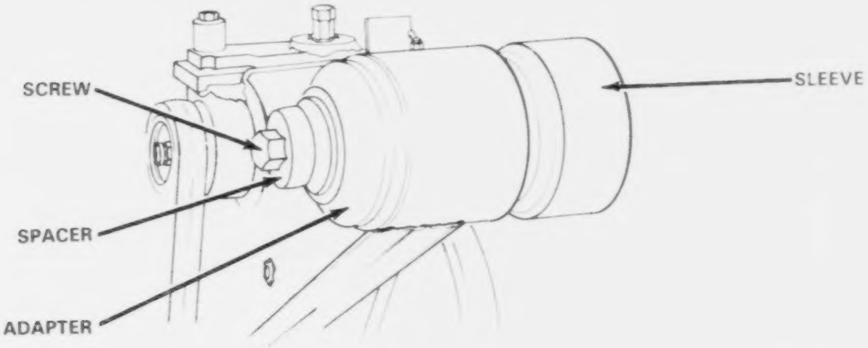
Step 3. Pack space in housing with grease. Pack inner ball bearing with grease and assemble. Refer to LO 9-2350-272-12 for correct grease.

Step 4. Use sleeve, adapter, spacer and center screw. Press inner bearing into track girder housing. Refer to Table 2-1, items 29, 28 and 27.


SPACER
SLEEVE
SCREW
ADAPTER

PRESSING INNER BALL BEARING IN TRACK GIRDER HOUSING

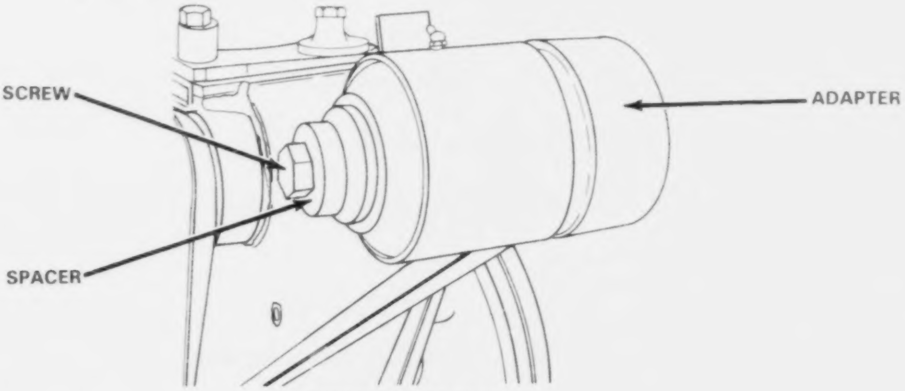
Step 5. Use sleeve, adapter, spacer and screw. Press in seals with tip facing outward. Refer to Table 2-1, items 29, 28 and 27.


SCREW
SLEEVE
SPACER
ADAPTER

PRESSING IN SEALS

Step 6. Put new inner preformed packings on wear rings.

Step 7. Use adapter, spacer and center screw. Press in wear rings. Refer to Table 2-1, items 28 and 26.


SCREW
ADAPTER
SPACER

PRESSING HUB IN PLACE

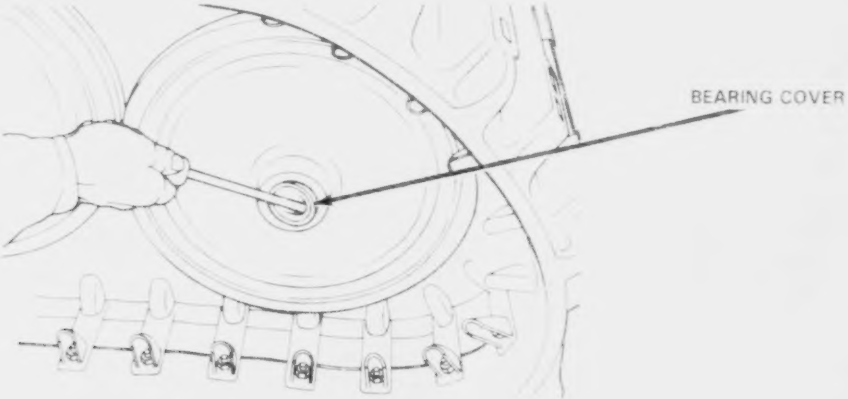
TA259302

Step 8. Put inner and outer V-rings in place with V-ring lip facing the seal ring.
Step 9. Lift front of track in place.
Step 10. Put cribbing support in place between track and track girder housing.
Step 11. Replace sprockets. Refer to paragraph 3-121.

3-123. REMOVE AND REPLACE TRACK TENSIONER.

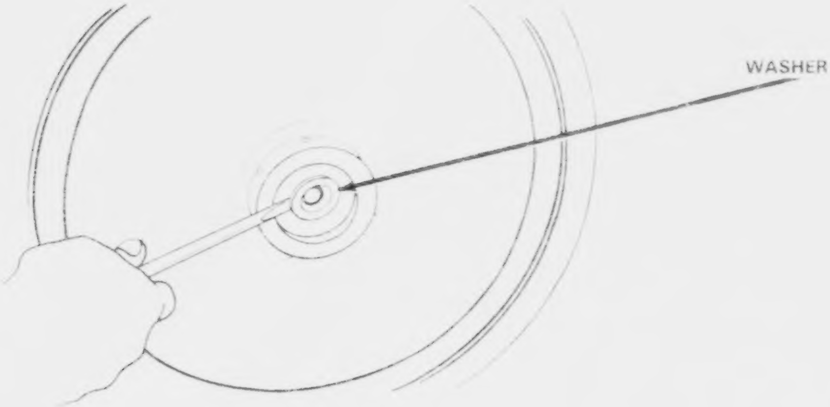
a. Remove.

Step 1. Remove two cotter pins on both sides, nuts and screws, holding track tensioner in operating position.
Step 2. Raise and support carrier so that wheels clear track horns.
Step 3. Push track tensioner down and forward.
Step 4. Punch out tensioning wheel bearing covers and discard.



REMOVING BEARING COVER

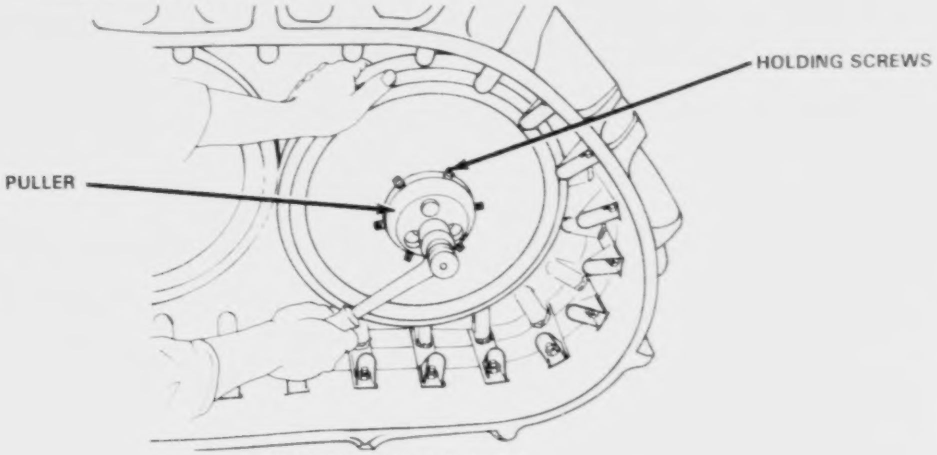
Step 5. Remove center screws and washers.



REMOVING WASHER

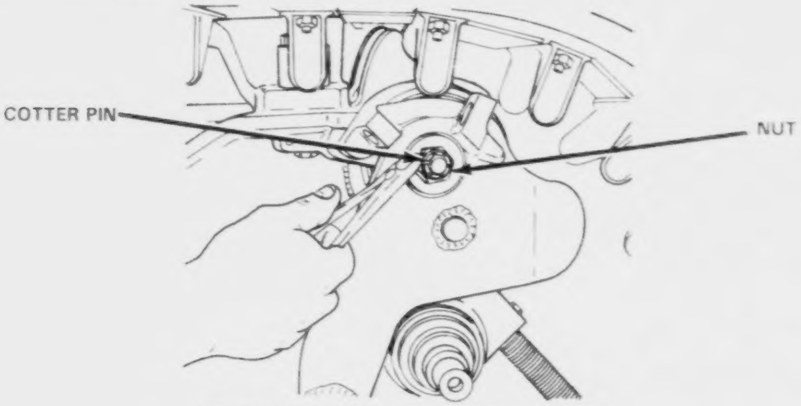
Step 6. Center puller on wheel and tighten holding screws. See Table 2-1, item 25.

Step 7. Using puller, remove wheels.


HOLDING SCREWS
PULLER

REMOVING TENSION WHEEL

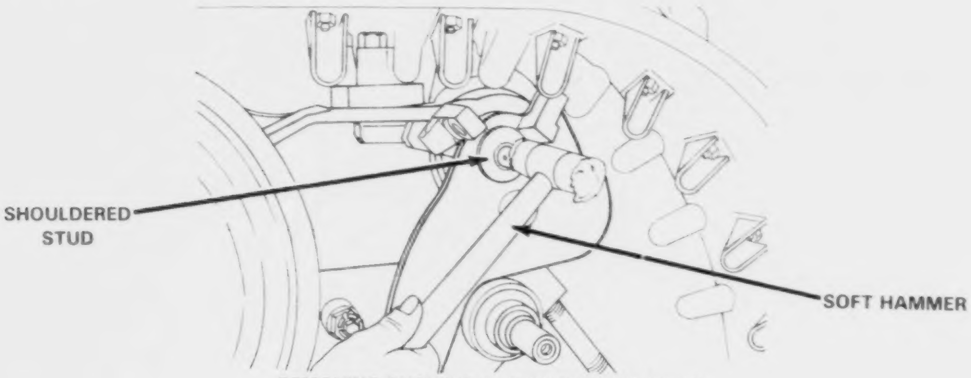
Step 8. Remove cotter pin and outside nut.


COTTER PIN
NUT

REMOVING COTTER PIN AND OUTSIDE NUT

Step 9. Tap shouldered stud with a soft hammer until bushing comes out of wheel support arm.

Step 10. Remove shouldered stud with inner bushing.


SHOULDERED STUD
SOFT HAMMER

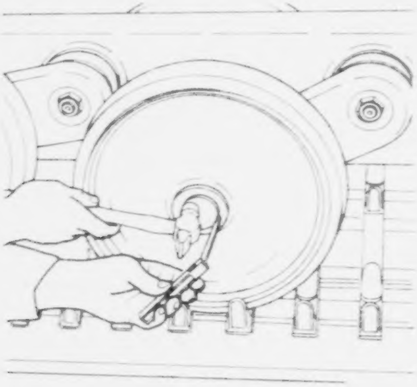
REMOVING BUSHING AND SHOLDERED STUD

TA259304

Step 11. Remove cotter pin nut and bushing from shouldered stud.
Step 12. Put shouldered stud back in and tap until outside bushing comes out of wheel support arm.
Step 13. Remove shouldered stud and bushings.
Step 14. Remove track tensioner.

b. Replace.

Step 1. Put bushings in place. Put track tensioner in place.
Step 2. Put one bushing and nut on shouldered stud.
Step 3. Put in cotter pin.
Step 4. Put shouldered stud in place.
Step 5. Put on other bushing and nut. Torque nut to 35 lb. ft. (50 Nm).
Step 6. Put in cotter pin. Put tension wheels in place.
Step 7. Put washers and center screws in place. Torque screws to 59 lb. ft. (80 Nm).
Step 8. Using feeler gage and hammer, put bearing cover in place.



REPLACING BEARING COVER

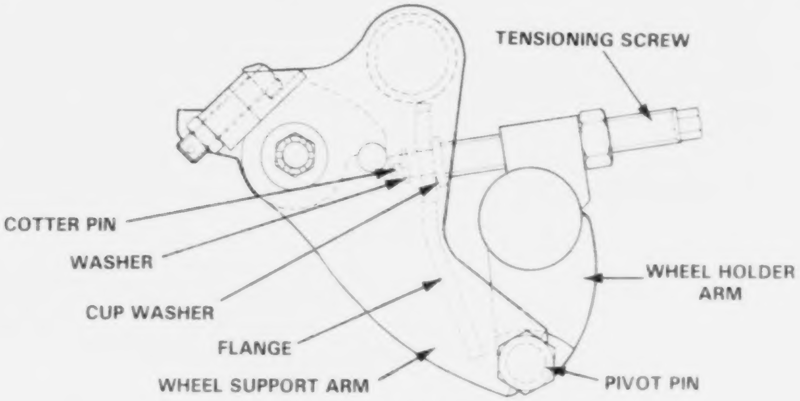
Step 9. Lower carrier onto track.
Step 10. Put in screw washer and nut holding track tensioner in operating position. Tighten nut.
Step 11. Put in cotter pin.
Step 12. Check and adjust track tension as needed. Refer to TM 9-2350-272-10.

TA259305

3-124. REMOVE AND REPLACE TENSIONING WHEEL SUPPORT ARM.

a. Remove.

Step 1. Remove track tensioner. Refer to paragragh 3-123.
Step 2. Remove cotter pin and washer from tensioning screw.
Step 3. Remove cotter pin, nuts and pivot pins.
Step 4. Remove wheel support arm.


TENSIONING SCREW
COTTER PIN
WASHER
CUP WASHER
FLANGE
WHEEL SUPPORT ARM
WHEEL HOLDER ARM
PIVOT PIN

TENSIONING SCREW ARRANGEMENT

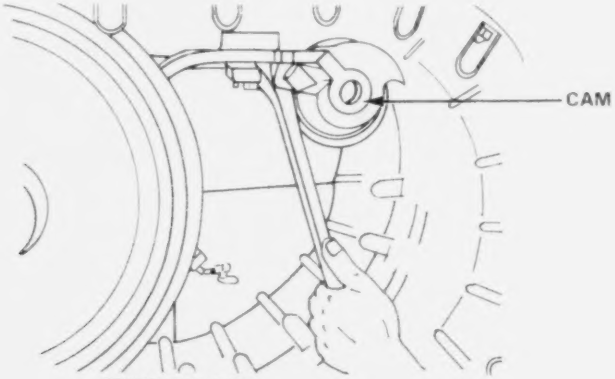
b. Replace.

Step 1. Put wheel support arm in place.
Step 2. Put pivot pins in place. Put on nuts. Torque nuts to 221 to 280 lb. ft. (300 to 380 Nm).
Step 3. Put washers and cotter pin in place on tensioning screw.
Step 4. Replace track tensioner. Refer to paragraph 3-123.

3-125. REMOVE AND REPLACE TRACK TENSIONER CAMS.

a. Remove.

Step 1. Remove track tensioner. Refer to paragraph 3-123.
Step 2. Remove cams from torsion spring.

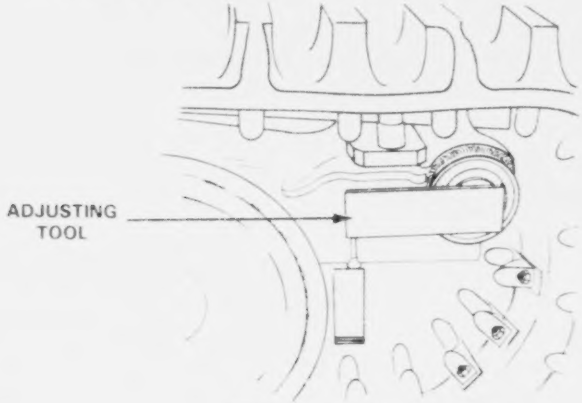


REMOVING CAM

TA259306

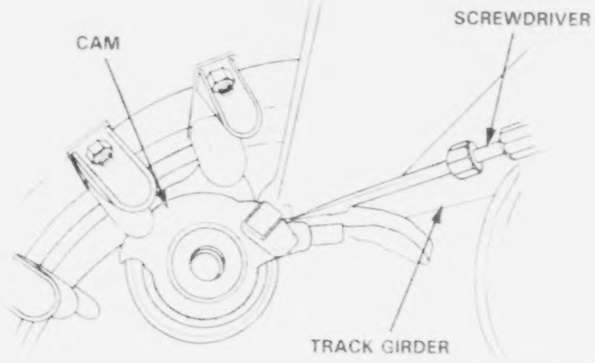
b. Replace.

Step 1. Use adjusting tool, apply tension to torsion spring to get the proper angle. Refer to Paragraph 3-108 for angle. See Table 2-1, item 30.



TENSIONING TORSION SPRING

Step 2. Put cam in torsion spring on opposite side of adjusting tool.
Step 3. Insert screwdriver flat in between cam and track girder.



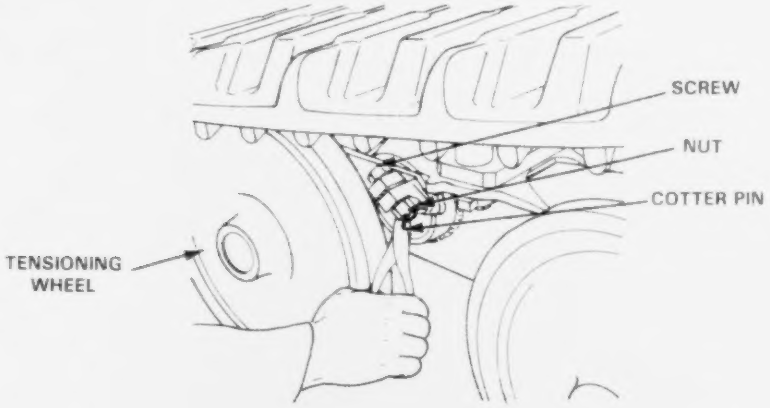
Step 4. Remove adjusting tool and put other cam in place.
Step 5. Replace track tensioner. Refer to paragraph 3-123.

TA259307

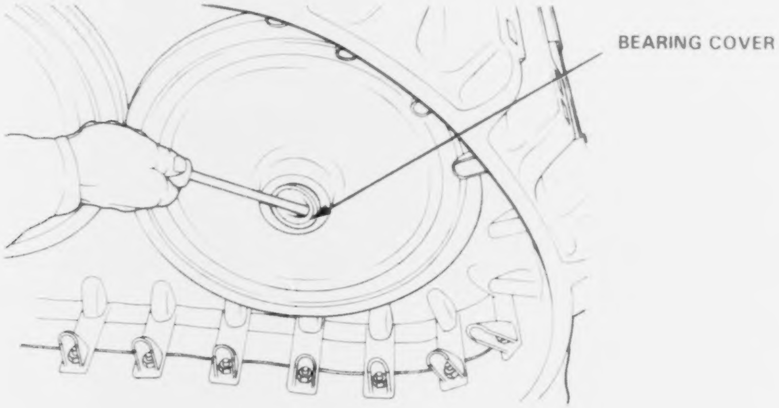
3-126. REMOVE AND REPLACE TENSIONING WHEEL.

a. Remove.

Step 1. Remove cotter pins, nuts, and screws.
Step 2. Raise and support carrier so wheel clears track horns.
Step 3. Push tensioning wheel down and forward.

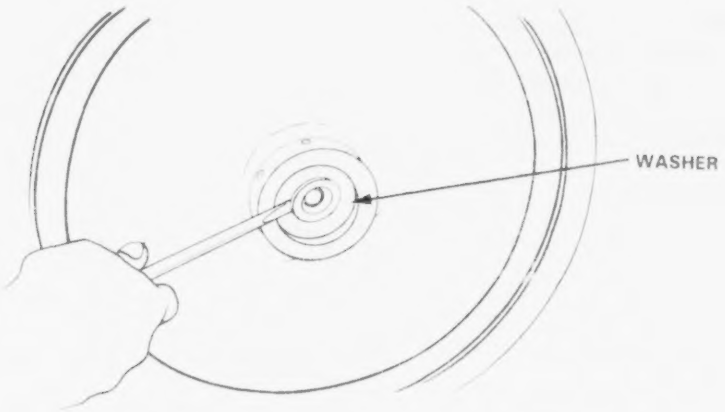

SCREW
NUT
COTTER PIN
TENSIONING WHEEL

Step 4. Punch out tensioning wheel bearings covers and discard.

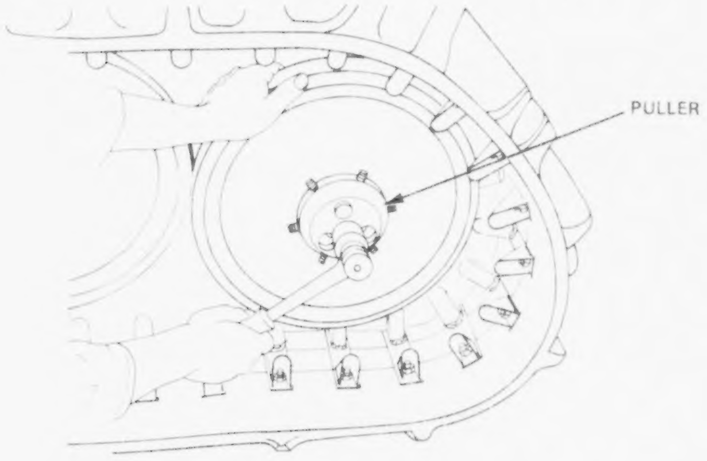

BEARING COVER

TA259308

Step 5. Remove screw from center of wheel. Remove washer.



Step 6. Using the puller, remove wheel. See Table 2-1, item 25.

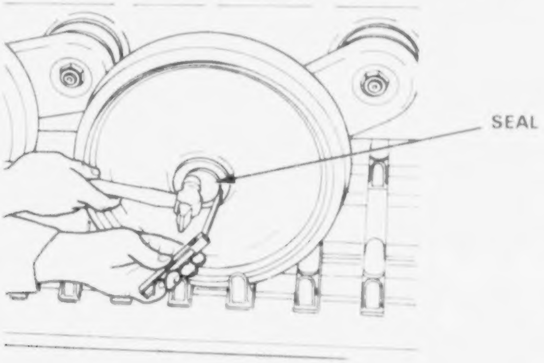


Step 7. Remove wear ring if installed.

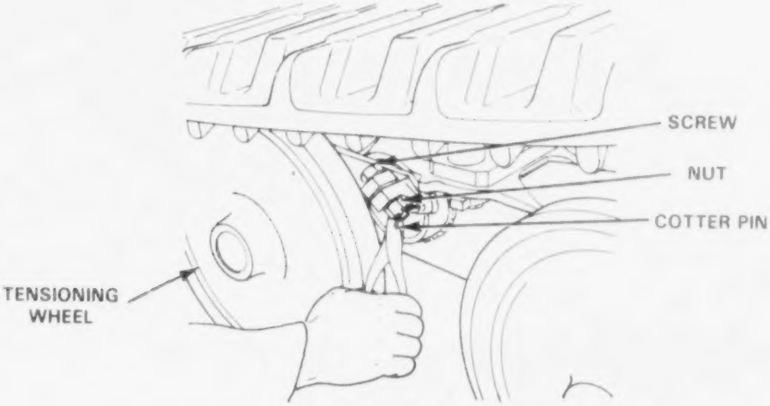
TA259309

b. Replace.

Step 1. Clean shaft and surrounding area. Put sealant on sealing surface.
Step 2. Put on new wear ring.
Step 3. Put tensioning wheel in place.
Step 4. Put washer and center screw in place. Torque screw to 59 lb. ft. (80 Nm).
Step 5. Using hammer and 0.50 mm feeler gage, put seal in place.



Step 6. Put tension wheel all the way to the rear.
Step 7. Remove supports and lower carrier.
Step 8. Put in screw holding track tensioner in operating position. Position screws with beveled cut up.
Step 9. Put on nuts. Tighten nuts. Put in cotter pins.



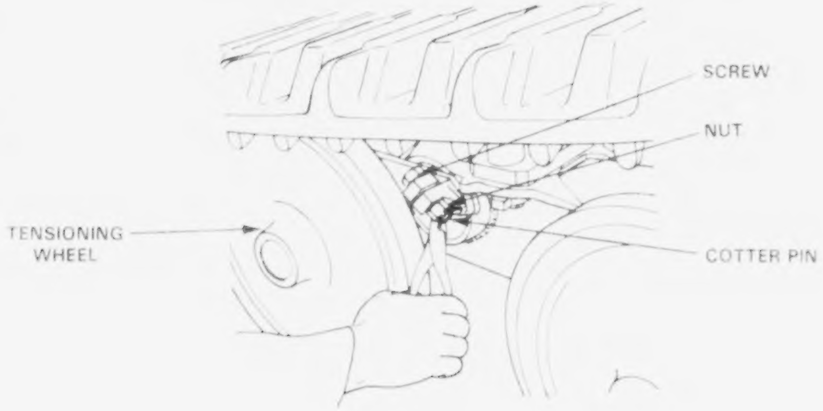
Step 10. Adjust track tension. Refer to TM 9-2350-272-10.

TA259310

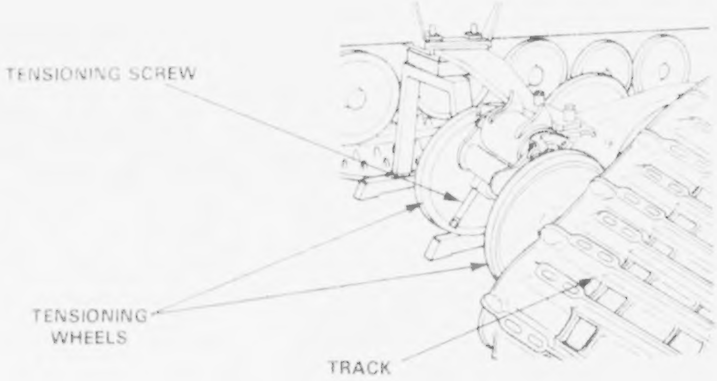
3-127. REMOVE AND REPLACE TRACK TENSIONING SCREW.

a. Remove.

Step 1. Remove two cotter pins nuts, screws and washers holding track tensioner in operating position.

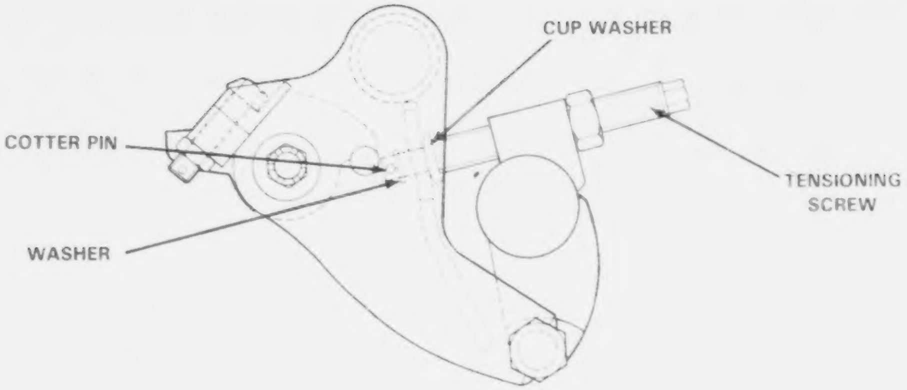

SCREW
NUT
TENSIONING WHEEL
COTTER PIN

Step 2. Raise and support carrier so that road wheels clear track horns.
Step 3. Push track tensioning wheels down and all the way forward.
Step 4. Lift track off tensioning wheels.


TENSIONING SCREW
TENSIONING WHEELS
TRACK

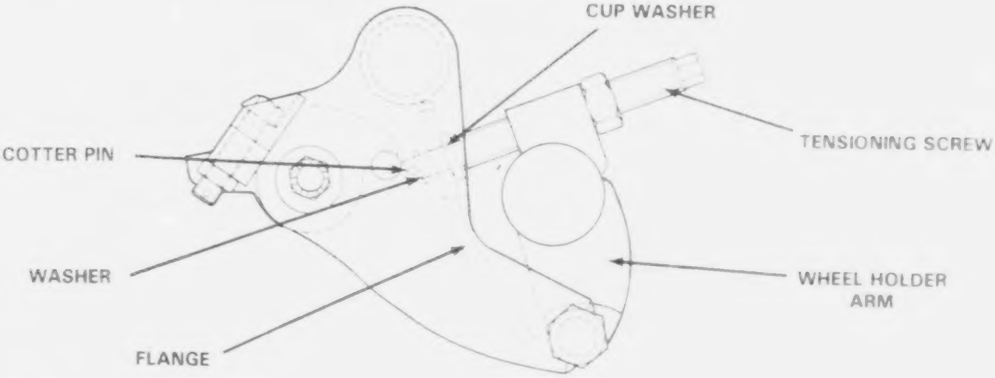
Step 5. Remove cotter pin and washer from tensioning screw.
Step 6. Remove tensioning screw and cup washer.

TA259311

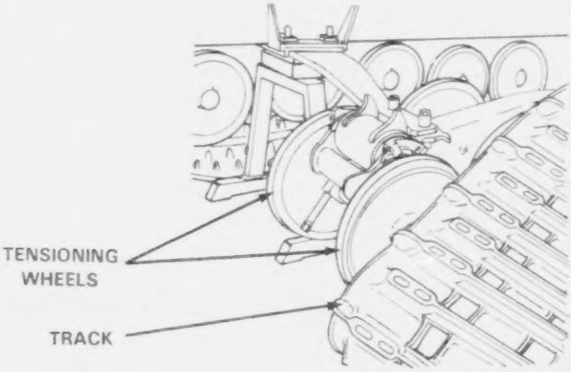

CUP WASHER
COTTER PIN
TENSIONING SCREW
WASHER

b. Replace.

Step 1. Screw tensioning screw through wheel holder arm. Put on cup washer.
Step 2. Screw tensioning screw through flange.
Step 3. Put on washer. Put in cotter pin.


CUP WASHER
COTTER PIN
TENSIONING SCREW
WASHER
WHEEL HOLDER ARM
FLANGE

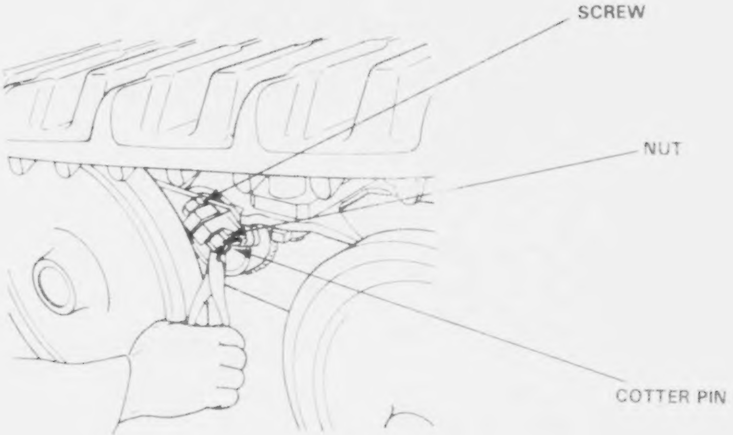
Step 4. Put track in place on tensioning wheels.


TENSIONING WHEELS
TRACK

TA259312

Step 5. Lower carrier.

Step 6. Put in screws, washers, and nuts holding track tensioner in operating position. Put in cotter pin.



Step 7. Adjust track tension. Refer to TM 9-2350-272-10.

TA259313

Section VIII. BODY MAINTENANCE INSTRUCTIONS.

3-128. REMOVE AND REPLACE DOOR.

a. Remove.

Step 1. Remove mounting screws on door.
Step 2. Remove door.

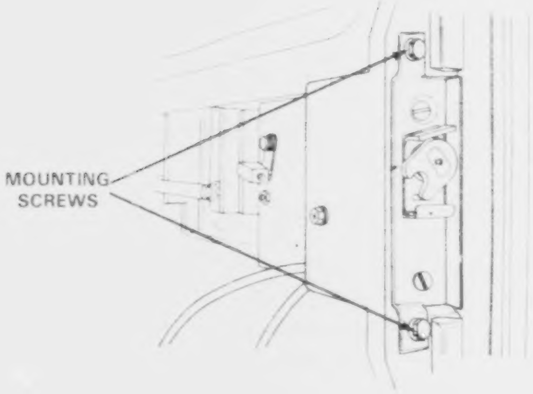
b. Replace.

Step 1. Put door in place.
Step 2. Screw in mounting screws.
Step 3. Adjust door locks. Refer to paragraph 3-130.

3-129. REMOVE AND REPLACE DOOR LOCKS.

a. Remove.

Step 1. Remove three screws holding door lock.
Step 2. Push aside door stripping.
Step 3. Remove lock. Remove bracket from lock.



b. Replace.

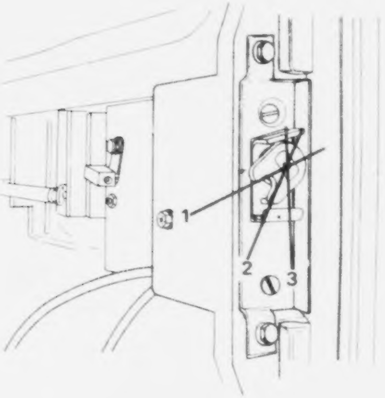
Step 1. Put lock bracket in place on door lock.
Step 2. Put door lock in place.
Step 3. Put in and tighten three mounting screws.
Step 4. Check operation of lock.

TA259314

3-130. ADJUST DOOR LOCKS.

NOTE

The door locks have three positions. When the door is closed the lock arm must be in position 3. Door must be adjusted to be water tight.



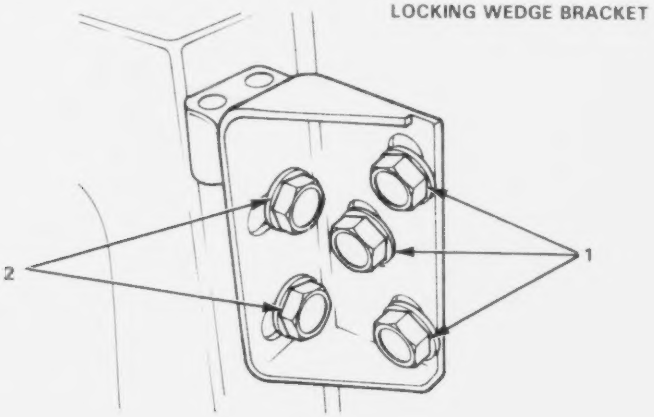
1 OPEN
2 SECURED
3 CLOSED

Step 1. Determine direction door must move.

NOTE

To move door up or down loosen screws (1).
To move door in or out loosen screws (2).

Step 2. Loosen screws.
Step 3. Move door into position. Tighten screws.
Step 4. Check adjustment.

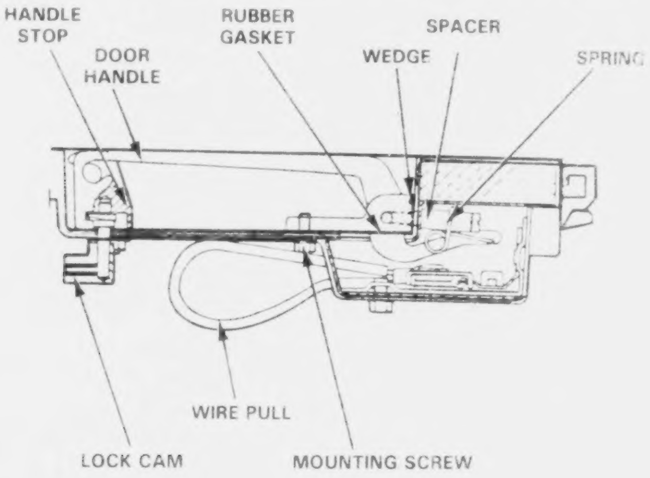


TA259315

3-131. REMOVE AND REPLACE DOOR HANDLES.

a. Remove.

Step 1. Remove door lock. Refer to paragraph 3-129.
Step 2. Remove spring.
Step 3. Remove two screws holding handle stop. Remove handle.
Step 4. Remove four screws and two spacers holding door handle.
Step 5. Remove door handle with wedge and rubber gasket.


HANDLE STOP
DOOR HANDLE
RUBBER GASKET
SPACER
WEDGE
SPRING
WIRE PULL
LOCK CAM
MOUNTING SCREW

b. Replace.

NOTE

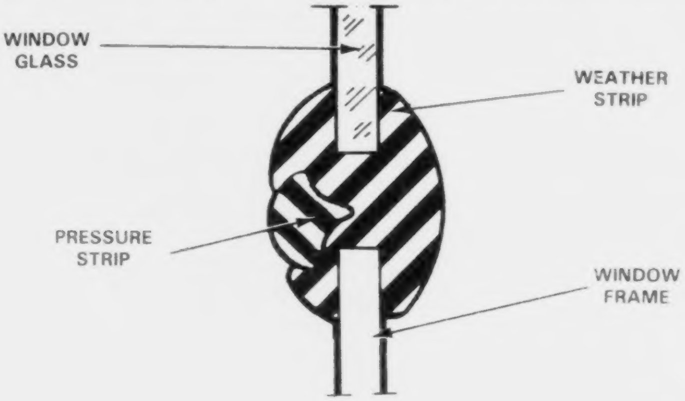
Rubber gasket must be water tight.

Step 1. Put door handle with wedge and rubber gasket in place.
Step 2. Put two spacer and four screws in place. Tighten screws.
Step 3. Put spring in place.
Step 4. Put handle stop in place. Screw in and tighten screws.
Step 5. Replace door lock. Refer to paragraph 3-129.
Step 6. Check operation of door.

3-132. REMOVE AND REPLACE WINDOW GLASS.

a. Remove.

Step 1. Remove pressure strip.
Step 2. Remove window glass.
Step 3. Remove weather strip.
Step 4. Clean window frame.
Step 5. Clean weather strip if not damaged. Replace damaged weather strip.



b. Replace.

NOTE

Joint on weather strip goes on top.

Step 1. Put weather strip in frame.
Step 2. Apply soap and water to weather strip.
Step 3. Put window glass in weather strip groove.
Step 4. Apply soap and water to pressure strip and pressure strip groove of weather strip.

NOTE

Joint on pressure strip goes on bottom.

Step 5. Press pressure strip in groove of weather strip.

3-133. REMOVE AND REPLACE FRONT CAR FRONT SEATS.

a. Remove.

NOTE

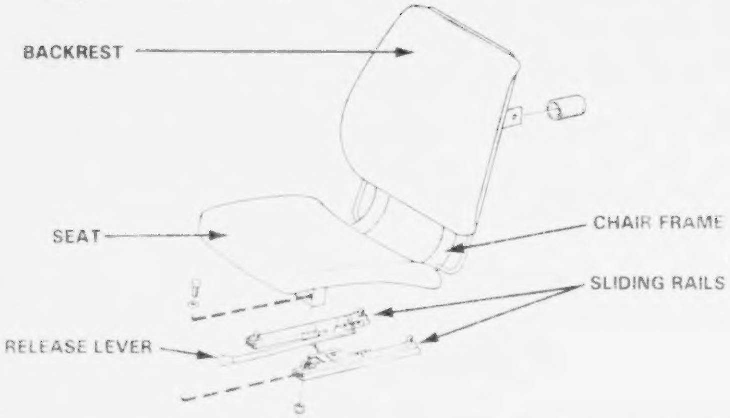
The only difference between the front seats is the driver's seat is adjustable front to rear.

Step 1. Remove nuts.
Step 2. Remove seat.

TA259317

b. Replace.

Step 1. Put seat in place.
Step 2. Put on nuts.


BACKREST
SEAT
CHAIR FRAME
SLIDING RAILS
RELEASE LEVER

3-134. REMOVE AND REPLACE FRONT CAR HEATER RADIATOR.

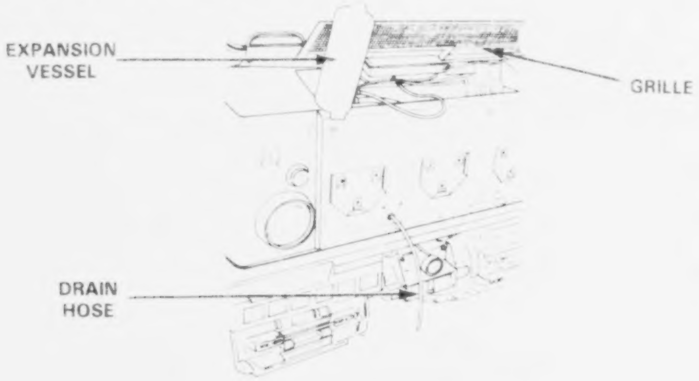
a. Remove.

Step 1. Open grill.
Step 2. Remove plug from front of car.
Step 3. Pull drain hose out.
Step 4. Remove elastic band from expansion vessel.
Step 5. Lift expansion vessel and support it on front of car.

WARNING

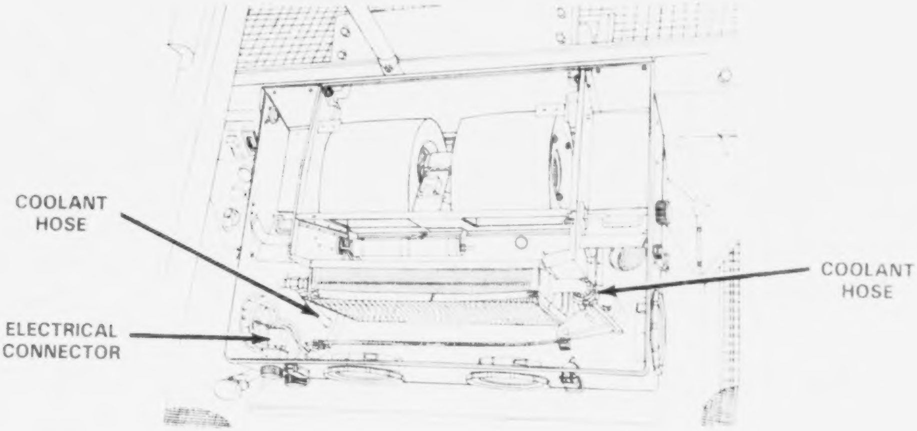
Let engine cool completly. Do not remove expansion vessel cap when engine is hot. Serious burns from hot engine coolant could result.

Step 6. Remove expansion vessel cap.
Step 7. Open radiator drain valve. Drain coolant.
Step 8. Close radiator drain valve.


EXPANSION VESSEL
GRILLE
DRAIN HOSE

TA259318

Step 8. Remove engine hood.
Step 9. Remove vent cover from top of heater assembly.
Step 10. Remove heater assembly cover.
Step 11. Remove right side engine access cover.
Step 12. Remove coolant hoses from heater radiator.
Step 13. Remove heater radiator.



b. Replace.

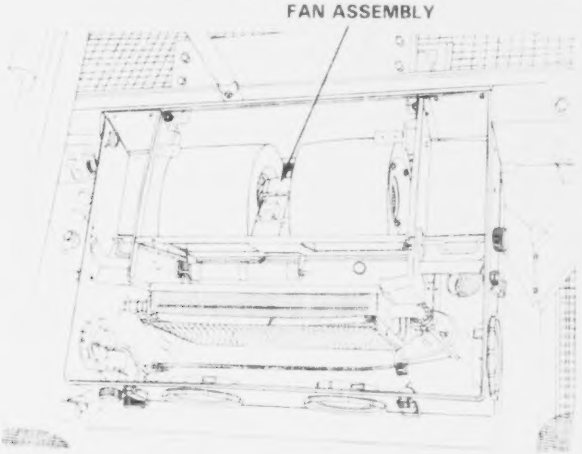
Step 1. Put radiator in place.
Step 2. Connect coolant hoses to heater.
Step 3. Fill and bleed cooling system. Refer to paragraph 3-23.
Step 4. Check heater for correct operation and leaks.
Step 5. Replace right side engine access cover.
Step 6. Put heater assembly cover in place. Screw in and tighten screws.
Step 7. Put vent cover in place. Screw in and tighten screws.
Step 8. Replace engine hood.

TA259319

3-135. REMOVE AND REPLACE FRONT CAR HEATER FAN ASSEMBLY.

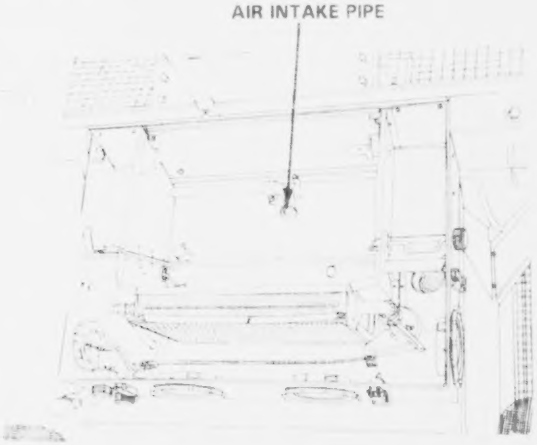
a. Remove.

Step 1. Remove vent cover from top of heater assembly.
Step 2. Remove heater assembly cover.
Step 3. Lift fan assembly and disconnect electrical connector.
Step 4. Remove fan assembly.



b. Replace.

Step 1. Put fan assembly in heater unit.
Step 2. Connect electrical connector.
Step 3. Put fan assembly in place connecting fan to air intake pipe.



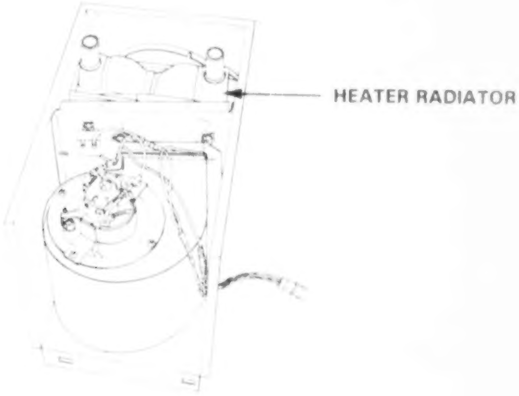
Step 4. Check operation of fan.
Step 5. Put heater assembly cover in place.
Step 6. Put vent cover in place. Screw in and tighten screws.

TA259320

3-136. REMOVE AND REPLACE REAR CAR HEATER RADIATOR.

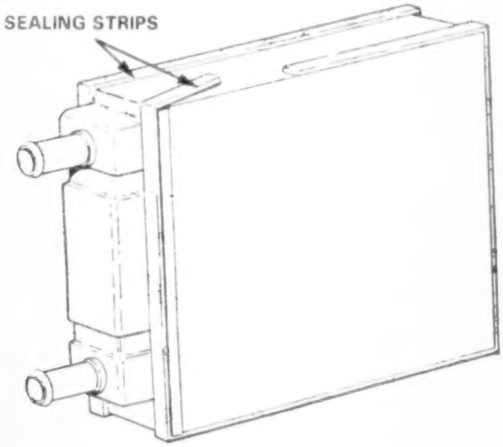
a. Remove.

Step 1. Remove heater assembly. Refer to paragraph 3-138.
Step 2. Remove 13 screws in heater side cover.
Step 3. Remove side cover.
Step 4. Remove heater radiator.



b. Replace.

Step 1. Make sure rubber strips are serviceable and in place.
Step 2. Put radiator in place. Screw in and tighten mounting screws.
Step 3. Put side cover in place. Screw in and tighten 13 screws.
Step 4. Replace heater assembly. Refer to paragraph 3-138.



TA259321

3-137. REMOVE AND REPLACE REAR CAR HEATER FAN ASSEMBLY.

a. Remove.

Step 1. Remove heater assembly. Refer to paragraph 3-138.
Step 2. Remove 13 screws in heater side cover.
Step 3. Remove side cover.
Step 4. Remove six fan motor mounting screws.
Step 5. Tag and disconnect electrical wires.
Step 6. Remove fan assembly with electric wires.

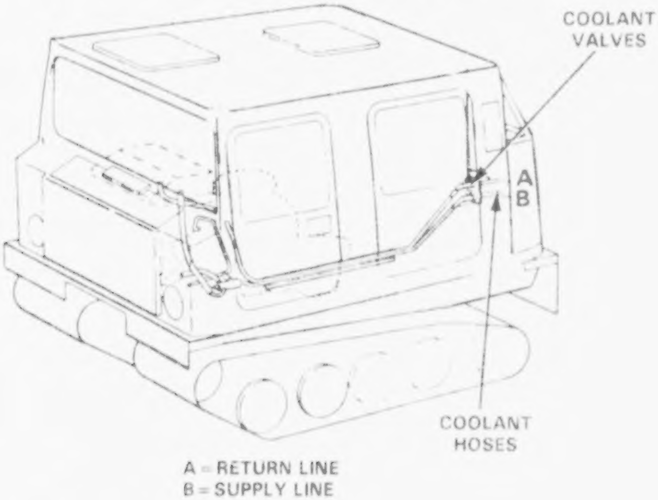
b. Replace.

Step 1. Put electric wires through grommet. Put fan assembly in place. Screw in and tighten six mounting screws.
Step 2. Put side cover in place. Screw in and tighten 13 screws.
Step 3. Replace heater assembly. Refer to paragraph 3-138.

3-138. REMOVE AND REPLACE REAR CAR HEATER ASSEMBLY.

a. Remove.

Step 1. Turn off coolant valves located in air shaft of front car.



Step 2. Remove bench seat in rear car.
Step 3. Drain rear car water system.
Step 4. Disconnect electrical connector.
Step 5. Tag and disconnect coolant hoses from heater unit.
Step 6. Remove air duct. Remove mounting screws. Remove heater unit.

TA259322

b. Replace.

Step 1. Clean contact surfaces on air shaft.
Step 2. Make sure drain hole is not blocked.
Step 3. Put heater unit in place. Screw in and tighten mounting screws.
Step 4. Connect air duct.
Step 5. Using location tags, connect coolant hoses to heater.
Step 6. Connect electrical connector.
Step 7. Turn on coolant valves.
Step 8. Fill and bleed cooling system. Refer to paragraph 3-23.
Step 9. Check for leaks.
Step 10. Check operation of heater.
Step 11. Replace bench seat in rear car.

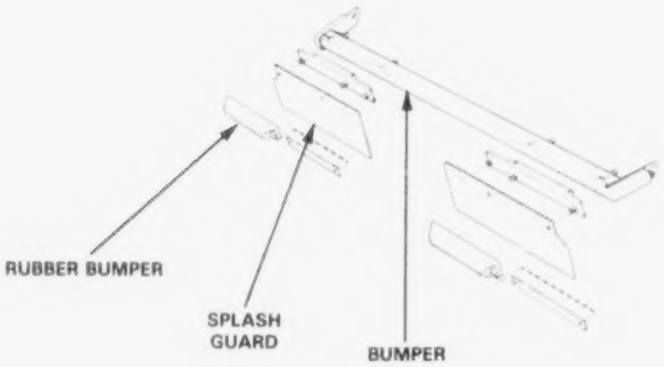
3-139. REMOVE AND REPLACE FRONT CAR FRONT BUMPERS.

a. Remove.

Step 1. Remove nuts, washers and screws holding bumper.
Step 2. Remove bumper.

b. Replace.

Step 1. Apply sealing compound to screws and screw holes.
Step 2. Put bumper in place.
Step 3. Put on washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 4. Put in screws, washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).



3-140. REMOVE AND REPLACE FRONT CAR LEFT REAR BUMPER.

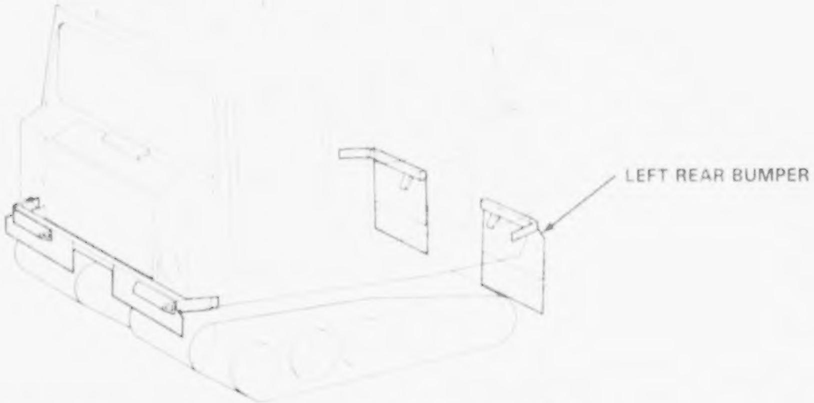
a. Remove.

Step 1. Remove batteries. Refer to paragraph 3-75.
Step 2. Remove splash guard.
Step 3. Remove nuts, washers and screws holding bumper.
Step 4. Remove bumper.

TA259323

b. Replace.

Step 1. Apply sealing compound to screws and screw holes.
Step 2. Put bumper in place.
Step 3. Put on washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 4. Put in screws, washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 5. Replace batteries. Refer to paragraph 3-75.
Step 6. Replace splash guards.



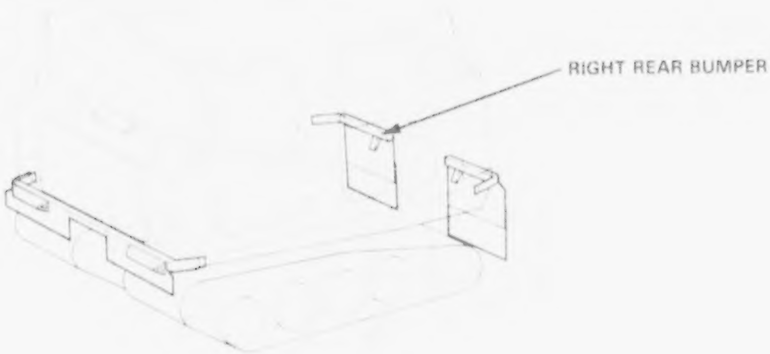
3-141. REMOVE AND REPLACE FRONT CAR RIGHT REAR BUMPER.

a. Remove.

Step 1. Remove four screws and washers holding equipment box.
Step 2. Remove equipment box.
Step 3. Remove splash guard.
Step 4. Remove three nuts, washers and screws holding bumper.
Step 5. Remove bumper.

b. Replace.

Step 1. Apply sealing compound to screws and screw holes.
Step 2. Put on washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 3. Put in screws, washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 4. Replace splash guards.
Step 5. Put equipment box in place. Screw in four screws with washers. Tighten screws.



TA259324

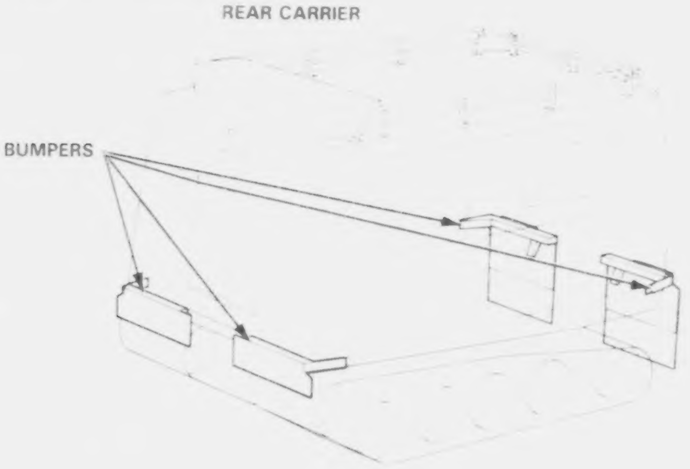
3-142. REMOVE AND REPLACE REAR CAR FRONT AND REAR BUMPERS.

a. Remove.

Step 1. Remove seat.
Step 2. Remove three nuts and washers holding bumpers.
Step 3. Remove bumper.

b. Replace.

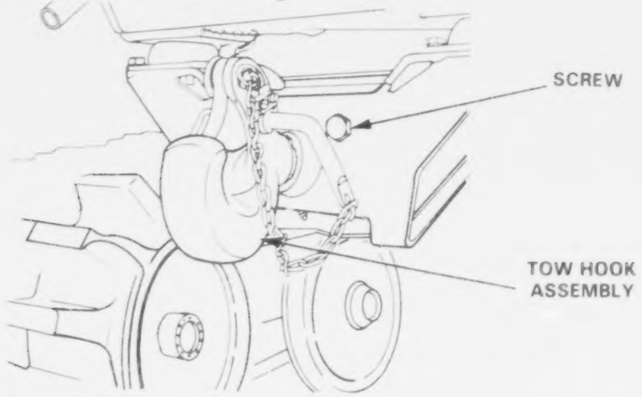
Step 1. Apply sealing compound to screws and screw holes.
Step 2. Put bumper in place.
Step 3. Put on washers and nuts. Torque nuts to 51 lb. ft. (70 Nm).
Step 4. Replace seat.



3-143. REMOVE, DISASSEMBLE, ASSEMBLE AND REPLACE TOW HOOK.

a. Remove.

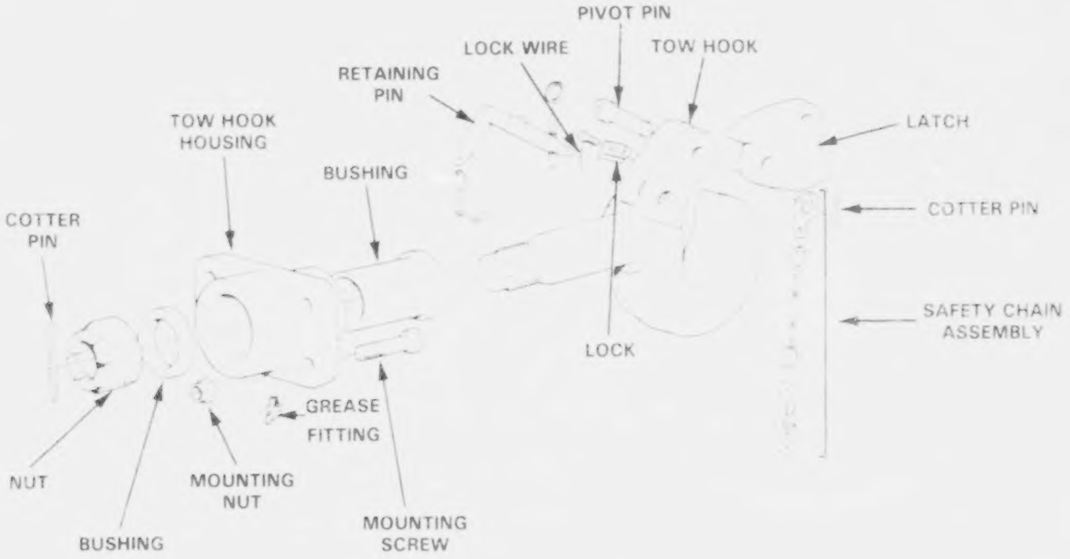
Step 1. Remove cotter pin, nut and tow hook.
Step 2. Loosen and remove four mounting nuts and screws.
Step 3. Remove tow hook housing.



TA259325

b. Disassemble

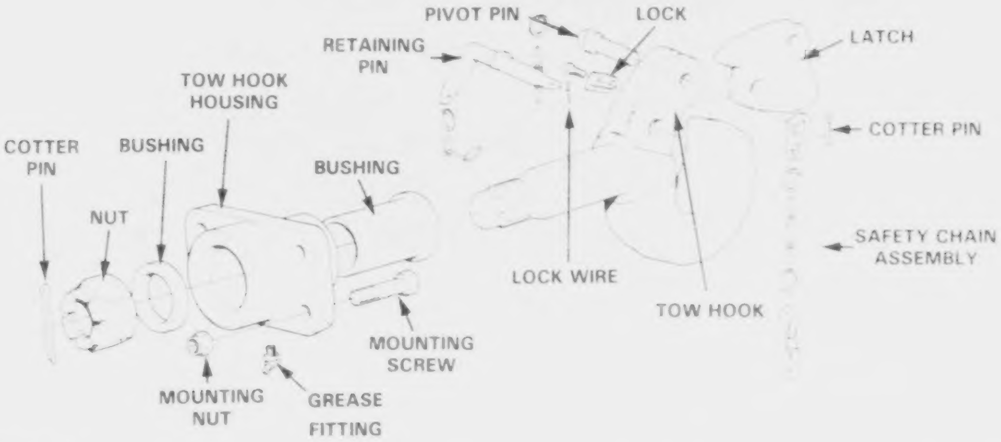
Step 1. Place tow hook in vise.
Step 2. Unhook retaining pin safety hook.
Step 3. Pull out retaining pin.
Step 4. Remove cotter pin and safety chain assembly.
Step 5. Remove pivot pin and latch.
Step 6. Remove locking wire.
Step 7. Remove two screws and lock.
Step 8. Remove grease fitting.
Step 9. Remove bushings.


PIVOT PIN
LOCK WIRE
TOW HOOK
RETAINING PIN
TOW HOOK HOUSING
LATCH
BUSHING
COTTER PIN
COTTER PIN
SAFETY CHAIN ASSEMBLY
LOCK
GREASE FITTING
NUT
MOUNTING NUT
BUSHING
MOUNTING SCREW

TA259326

c. Assemble

Step 1. Press two bushings into housing.
Step 2. Put in grease fitting.
Step 3. Put lock in place, put in and tighten two screws.
Step 4. Put in and secure locking wire.
Step 5. Put latch in place. Put in pivot pin.
Step 6. Put safety chain assembly on pivot.
Step 7. Put in and secure cotter pin.
Step 8. Put retaining pin in place. Connect safety hook.


PIVOT PIN
LOCK
LATCH
RETAINING PIN
TOW HOOK HOUSING
COTTER PIN
BUSHING
BUSHING
COTTER PIN
NUT
SAFETY CHAIN ASSEMBLY
LOCK WIRE
TOW HOOK
MOUNTING SCREW
MOUNTING NUT
GREASE FITTING

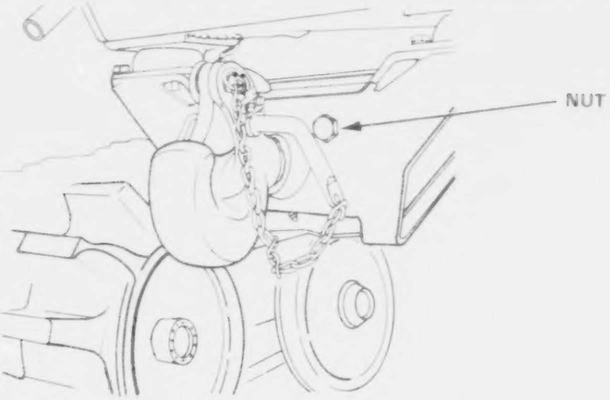
d. Replace.

Step 1. Put four mounting screws in place. Screw on and tighten four nuts.
Step 2. Put tow hook in place.

NOTE

Tow hook when properly tightened will turn left and right, but will not move in or out.

Step 3. Put nut on rear of tow hook. Tighten nut. Put in cotter pin.



Step 4. Grease tow hook. Refer to LO 9-2350-272-12.

TA259327

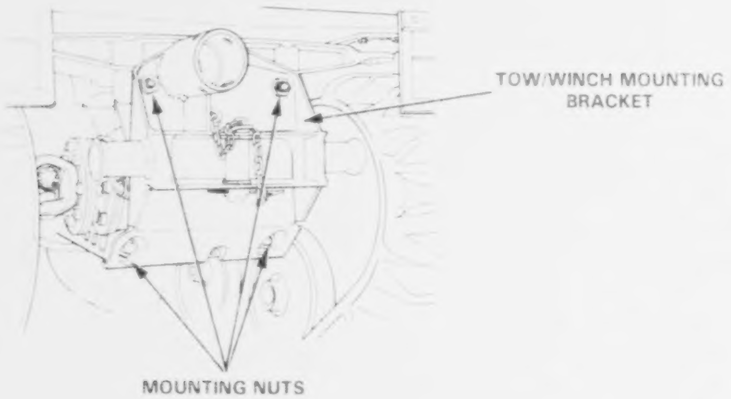
3-144. REMOVE AND REPLACE WINCH MOUNTING BRACKET.

a. Remove.

Step 1. Remove four mounting nuts.
Step 2. Remove bracket.

b. Replace.

Step 1. Put bracket in place.
Step 2. Screw on mounting nuts. Torque nuts to 325 lb. ft. (440 Nm).



3-145. REMOVE AND REPLACE GRILLES.

a. Remove front grille.

Step 1. Remove four retaining pins.
Step 2. Disconnect windshield washer hose.
Step 3. Remove grille.

b. Replace front grille.

Step 1. Put grille in place.
Step 2. Put in two rear retaining pins.
Step 3. Connect windshield washer hose.
Step 4. Put in two front retaining pins.

c. Remove upper rear grille.

Step 1. Remove lower rear grille.
Step 2. Remove grille mounting nuts, washers and screws.
Step 3. Remove grille.

TA259328

d. Replace upper rear grille.

Step 1. Put grille in place.
Step 2. Put in screws. Put on washers and nuts. Tighten nuts.
Step 3. Replace lower rear grille.

e. Remove lower rear grille.

Step 1. Remove four retaining pins.
Step 2. Remove rear grille.

f. Replace.

Step 1. Make sure rubber strip is in place on rear grille.
Step 2. Put grille in place. Put in four retaining pins.

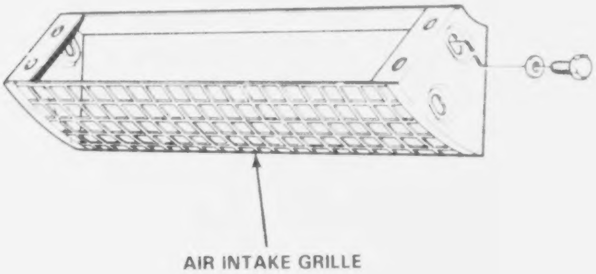
3-146. REMOVE AND REPLACE AIR INTAKE GRILLE

a. Remove.

Step 1. Remove mounting screws, nuts and washers.
Step 2. Remove grille.

b. Replace.

Step 1. Put grille in place.
Step 2. Put in and tighten washers, screws and nuts.



3-147. REMOVE AND REPLACE GRILLE STUDS

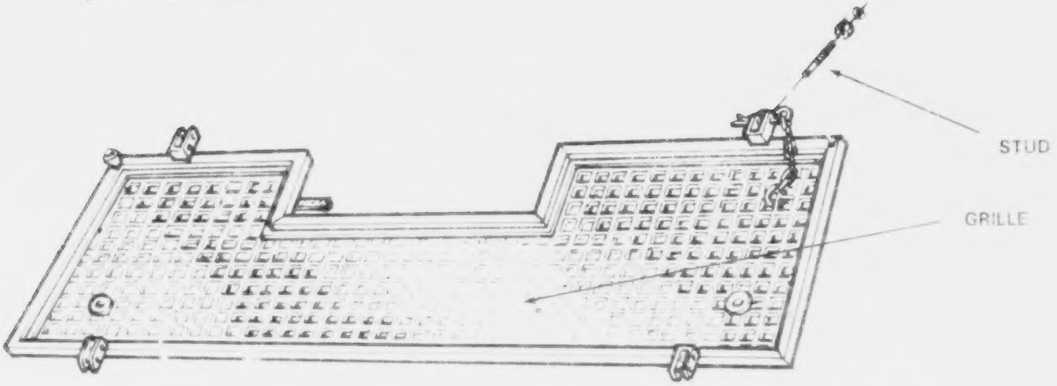
a. Remove.

Step 1. Open grille.
Step 2. Remove nut and washer from stud.
Step 3. Remove stud.

TA259329

b. Replace.

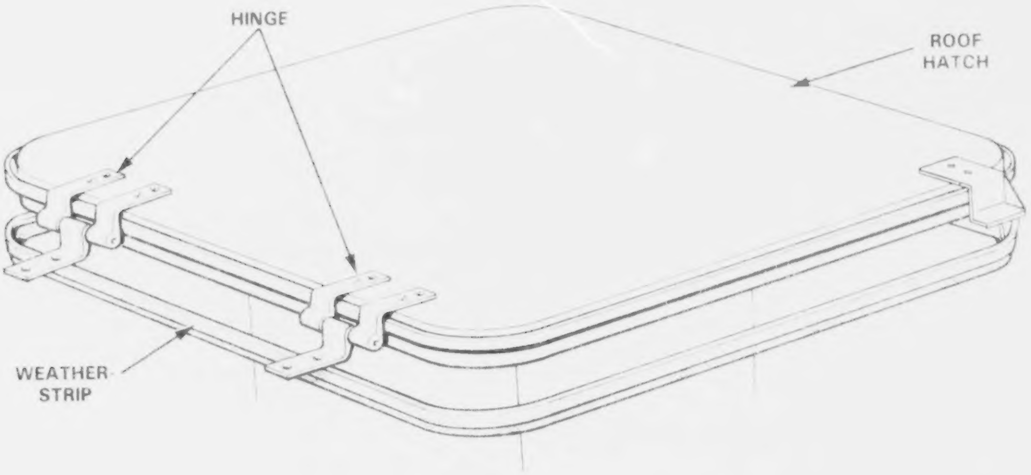
Step 1. Put stud in place.
Step 2. Put on washer and nut. Tighten nut.
Step 3. Close grille.


STUD
GRILLE

3-148. REMOVE AND REPLACE ROOF HATCHES

a. Remove.

Step 1. Remove screws from hatch hinges.
Step 2. Unlatch hatch door.
Step 3. Remove hatch door.


HINGE
ROOF HATCH
WEATHER-STRIP

TA259330

b. **Replace.**

CAUTION

Do not overtighten hinge mounting screws. Overtightening screw will stop hatch from closing properly.

NOTE

Weather strip must have a water tight seal. If weather strip is damaged it must be replaced.

Step 1. Check weather strip for damage.
Step 2. Put hatch in place.
Step 3. Put in hatch hinge screws. Tighten screws.
Step 4. Check seating of hatch. Place a piece of paper between hatch and roof top. Slide paper along the roof hatch. The paper should slide without dragging or binding.
Step 5. If paper drags or binds place shims between hinges and roof, and between lock and hatch as necessary.

3-149. REMOVE AND REPLACE ACCESS COVERS

a. **Remove.**

NOTE

Left and right access covers are removed the same way.

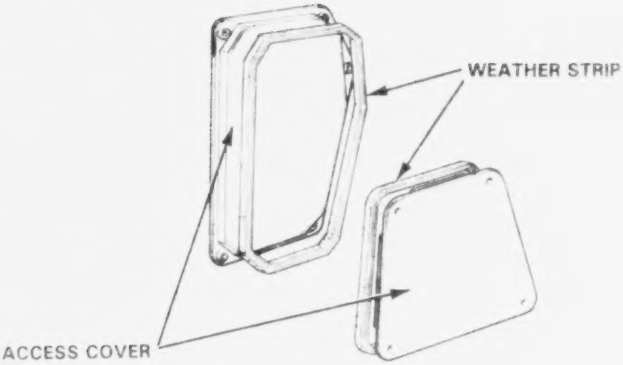
Step 1. Unscrew four screws.
Step 2. Remove access cover.

b. **Replace.**

NOTE

Weather strip must have a tight seal. If weather strip is damaged it must be replaced.

Step 1. Check weather strip for damage.
Step 2. Put access cover in place.
Step 3. Screw in and tighten four screws.



3-150. REMOVE AND REPLACE REAR CAR SIDE HATCH

a. Remove.

Step 1. Remove eight screws from side hatch hinges.
Step 2. Unlatch and remove side hatch.

b. Replace.

NOTE

Weather strip must have a water tight seal. If weather strip is damaged it must be replaced.

Step 1. Check weather strip for damage.
Step 2. Put side hatch in place.
Step 3. Screw in side hatch hinge screws. Tighten screws.
Step 4. Check sealing of side hatch.

TA259331

3-151. REMOVE AND REPLACE FRONT CAR EQUIPMENT BOX

a. Remove.

Step 1. Open equipment box and remove equipment.
Step 2. Remove mounting screws and washers.
Step 3. Remove equipment box.

b. Replace.

Step 1. Put equipment box in place.
Step 2. Screw in mounting screws with washers. Tighten screws.
Step 3. Put equipment in box. Close and latch cover.

3-152. REMOVE AND REPLACE REAR CAR EQUIPMENT BOX

a. Remove.

Step 1. Open equipment box and remove equipment.
Step 2. Remove mounting screws, washers and nuts.
Step 3. Remove equipment box.

b. Replace.

Step 1. Put equipment box in place.
Step 2. Put in mounting screws with washers. Put on and tighten nuts.
Step 3. Put equipment in box. Close and latch cover.

3-153. REMOVE AND REPLACE BLACKOUT CURTAINS

a. Remove.

Step 1. Drill out curtain mounting rivets.
Step 2. Remove blackout curtain.

b. Replace.

Step 1. Hold curtain in place.
Step 2. Install mounting rivets.

3-154. REMOVE AND REPLACE REAR CAR SEATS AND SEAT BACK.

a. Remove.

Step 1. Unhook seat from mounting brackets.
Step 2. Remove seat.
Step 3. Remove screws from seat back.
Step 4. Remove seat back.

b. Replace.

Step 1. Hold seat back in place.
Step 2. Put in screws. Tighten screws.
Step 3. Hook seat into mounting brackets.

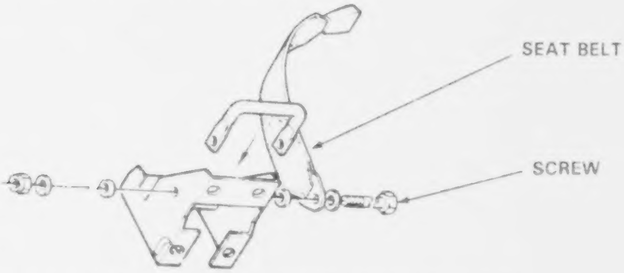
3-155. REMOVE AND REPLACE SEATBELTS (REAR CAR).

a. Remove.

Step 1. Remove mounting screw, nut, spacers, and washers from belt.
Step 2. Remove seat belt.

b. Replace.

Step 1. Put seat belt in place.
Step 2. Put in mounting screw.
Step 3. Put on nut, spacers, and washers. Tighten nut.



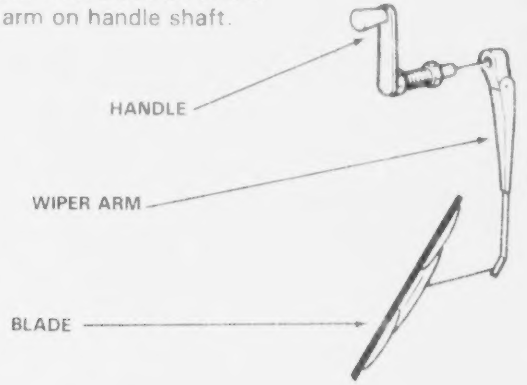
3-156. REMOVE AND REPLACE REAR WIPER ARM AND BLADE

a. Remove.

Step 1. Pry wiper arm from handle shaft.
Step 2. Remove wiper arm with blade.

b. Replace.

Step 1. Put wiper arm with blade on shaft.
Step 2. Seat wiper arm on handle shaft.



TA259332

3-157. REMOVE AND REPLACE REAR DOOR SECURITY CHAIN

a. Remove.

Step 1. Unhook chain from door.
Step 2. Remove mounting nut and screw from chain bracket.
Step 3. Remove chain.

b. Replace.

Step 1. Put chain and bracket in place.
Step 2. Put in bracket screw and nut. Tighten nut.
Step 3. Hook chain to door.

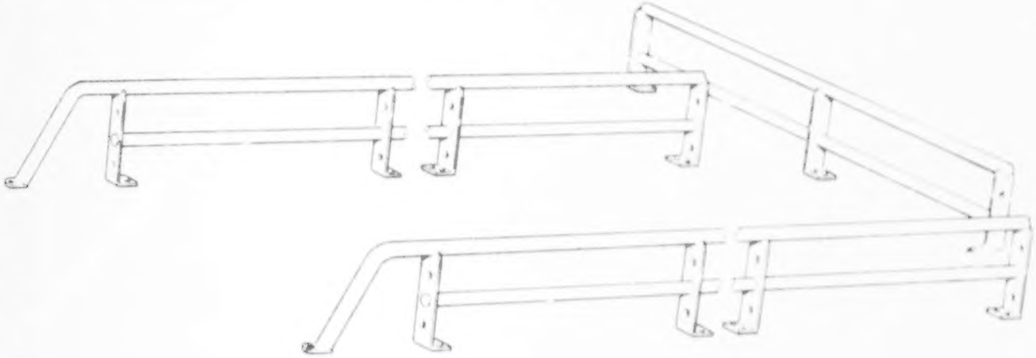
3-158. REMOVE AND REPLACE TOP STORAGE RACK

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove rack.

b. Replace.

Step 1. Put rack in place.
Step 2. Put in mounting screws. Tighten screws.



3-159. REMOVE AND REPLACE CARGO SUPPORT RACK (LITTER)

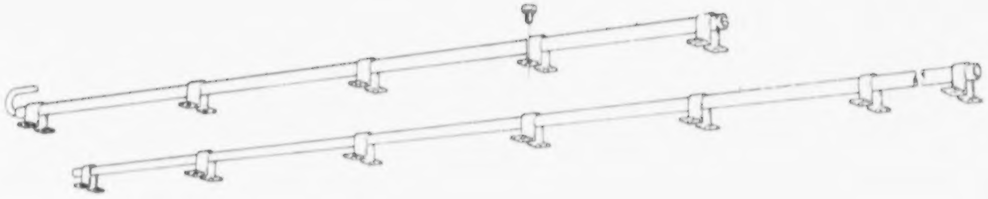
a. Remove.

Step 1. Remove rack mounting screws.
Step 2. Remove racks.

b. Replace.

Step 1. Hold rack in place.
Step 2. Put in mounting screws. Tighten screws.

TA259333



3-160. REMOVE AND REPLACE FUEL CAN SUPPORT

a. Remove.

Step 1. Remove fuel cans.
Step 2. Turn off coolant valve at rear of front car.
Step 3. Disconnect coolant hoses from rear car.
Step 4. Remove retaining nuts for coolant hose connectors.
Step 5. Remove mounting nuts, washers and screws.
Step 6. Remove support.

b. Replace.

Step 1. Put support in place.
Step 2. Put in mounting screws with washers and nuts. Tighten nuts.
Step 3. Put retaining nuts on coolant hose connectors.
Step 4. Connect coolant hose to rear car. Tighten lines.
Step 5. Turn on coolant valves.
Step 6. Replace fuel cans.

3-161. REMOVE AND REPLACE FIRE EXTINGUISHER/DECON BRACKET

a. Remove.

Step 1. Remove fire extinguisher and decon apparatus from bracket.
Step 2. Remove mounting screws, washers and nuts.
Step 3. Remove bracket.

b. Replace.

Step 1. Put bracket in place.
Step 2. Put in mounting screws.
Step 3. Put on washer and nuts. Tighten nuts.
Step 4. Install fire extinguisher and decon apparatus.

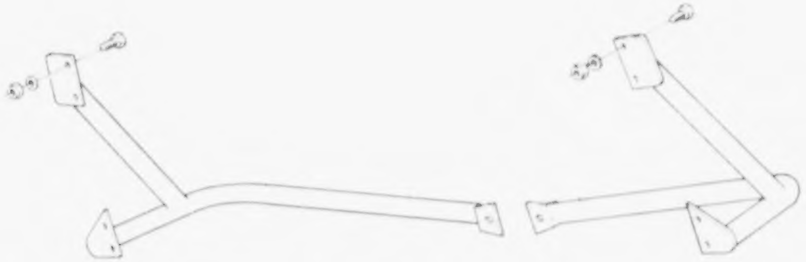
3-162. REMOVE AND REPLACE STORAGE RACKS. (FUEL TANK GUARD)

a. Remove.

Step 1. Remove nuts, washers and mounting screws.
Step 2. Remove storage racks.

b. Replace.

Step 1. Hold storage racks in place.
Step 2. Put in mounting screws.
Step 3. Put on nuts and washers. Tighten nuts.



3-163. REMOVE AND REPLACE SUN VISOR

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove sun visor.

b. Replace.

Step 1. Hold sun visor in place.
Step 2. Put in mounting screws. Tighten screws.

TA259334

3-164. REMOVE AND REPLACE SEAT BELT AND HARNESS. (FRONT CAR)

a. Remove.

Step 1. Remove cap at top of harness.
Step 2. Remove mounting screws, washers, and nuts from seat belt.
Step 3. Remove belt and harness.

b. Replace.

Step 1. Put belt and harness in place.
Step 2. Put in mounting screws, washers and nuts. Tighten nuts.
Step 3. Put on cap at top of harness.

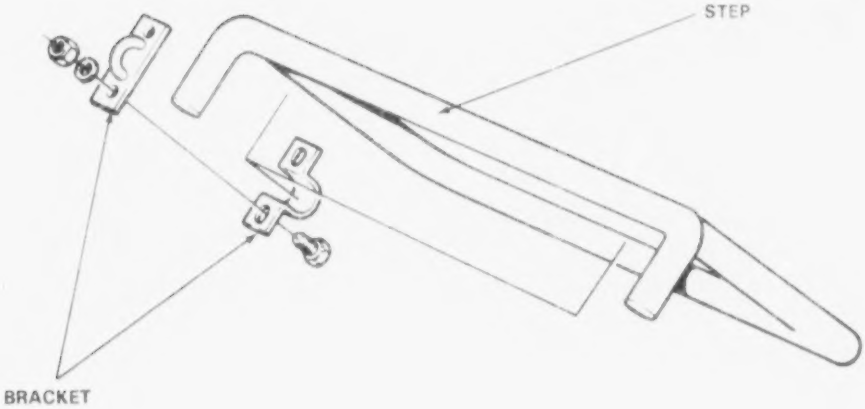
3-165. REMOVE AND REPLACE MOUNTING STEP

a. Remove.

Step 1. Remove mounting screws, nuts and brackets.
Step 2. Remove step.

b. Replace.

Step 1. Hold step in place.
Step 2. Put on brackets.
Step 3. Put in mounting screws. Tighten screws.



TA259335

3-166. REMOVE AND REPLACE DOOR SEAL

a. Remove.

Step 1. Pry seal out of groove in door.
Step 2. Remove seal.

b. Replace.

Step 1. Press seal into groove in door.
Step 2. Cut seal to proper length.
Step 3. Glue ends of seal together.

3-167. REMOVE AND REPLACE WINDSHIELD WIPER BLADE.

a. Remove.

Step 1. Press fastening clip.
Step 2. Remove blade from arm.

b. Replace.

Step 1. Slide blade on arm.
Step 2. Lock fastening clip.

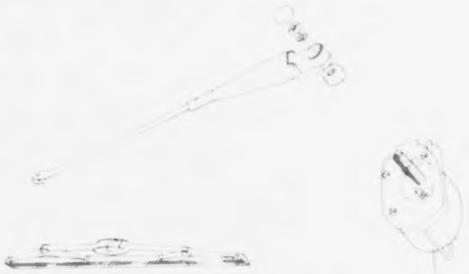
3-168. REMOVE AND REPLACE WINDSHIELD WIPER ARM (FRONT)

a. Remove.

Step 1. Remove cap.
Step 2. Remove nut and washer.
Step 3. Pull off wiper arm and bushing.

b. Replace.

Step 1. Put bushing on shaft.
Step 2. Put on wiper arm.
Step 3. Put on washer and nut. Tighten nut.
Step 4. Put on cap.



TA259336

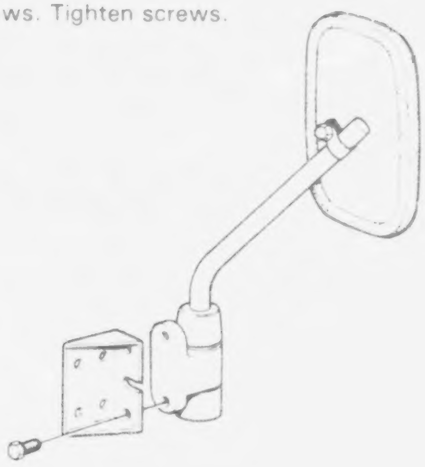
3-169. REMOVE AND REPLACE REARVIEW MIRROR

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove mirror from bracket.

b. Replace.

Step 1. Hold mirror in place.
Step 2. Put in mounting screws. Tighten screws.



3-170. REMOVE AND REPLACE REFLECTORS

a. Remove.

Step 1. Remove screws.
Step 2. Remove reflectors.

b. Replace.

Step 1. Put reflector in place.
Step 2. Put in screws. Tighten screws.

3-171. REMOVE AND REPLACE BLACKOUT LIGHT BRACKET

a. Remove.

Step 1. Drill out rivets.
Step 2. Remove bracket.

b. Replace.

Step 1. Put bracket in place.
Step 2. Put in rivets.

TA259337

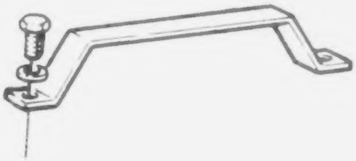
3-172. REMOVE AND REPLACE ROOF HANDLES

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove handle.

b. Replace.

Step 1. Put handle in place.
Step 2. Put in mounting screws. Tighten screws.



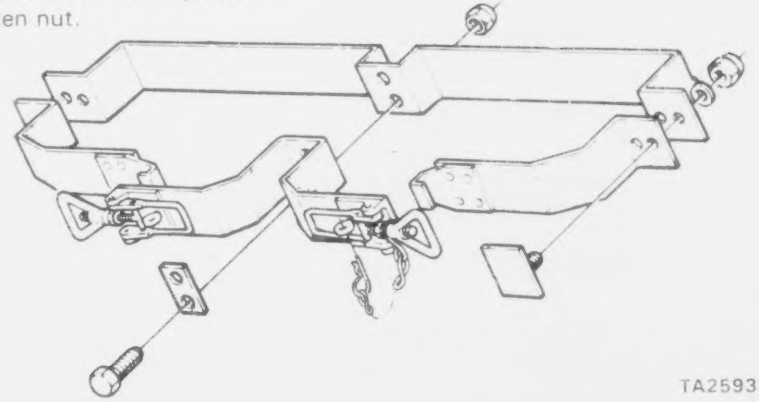
3-173. REMOVE REPLACE FUEL CAN STRAPS

a. Remove.

Step 1. Remove nuts and washer from strap mounting plate.
Step 2. Remove center screw, washer, plate and nut.
Step 3. Remove strap.

b. Replace.

Step 1. Put strap and mounting plate in place.
Step 2. Put on nut and washer. Tighten nut.
Step 3. Put in center screw, washer and plate.
Step 4. Put on nut. Tighten nut.



TA259338

3-174. REMOVE AND REPLACE HATCH BUMPER

a. Remove.

Step 1. Remove screw.
Step 2. Remove bumper.

b. Replace.

Step 1. Put bumper in place.
Step 2. Put in screw. Tighten screw.

3-175. REMOVE AND REPLACE HATCH SUPPORT.

a. Remove.

Step 1. Remove mounting screws.
Step 2. Remove hatch support.

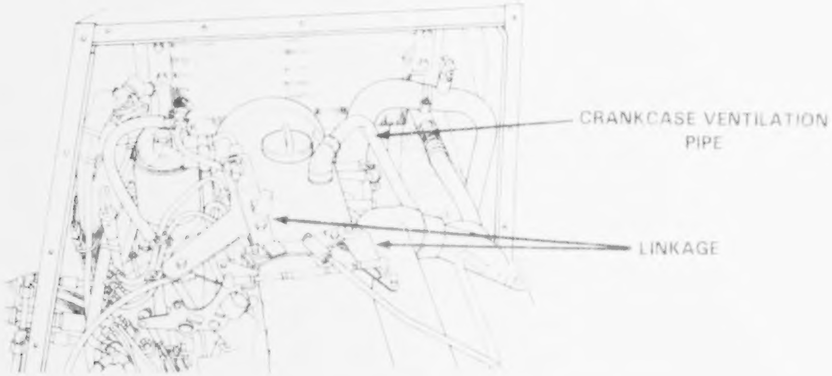
b. Replace.

Step 1. Put hatch support in place.
Step 2. Put in mounting screws. Tighten screws.

3-176. REMOVE AND REPLACE CYLINDER HEAD COVER.

a. Remove.

Step 1. Remove engine hood.
Step 2. Remove linkage from cylinder head cover.
Step 3. Remove crankcase ventilation pipe from cylinder head cover and air intake at turbocharger.



Step 4. Loosen and remove four mounting nuts from cylinder head cover.
Step 5. Remove cylinder head cover and gasket.

TA259342

b. Inspect.

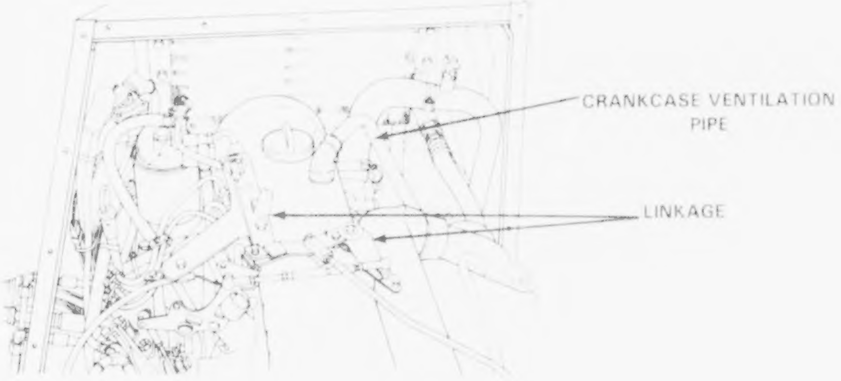
WARNING

Cleaning solvent, federal specification P-D-680, type II, is flammable and gives off harmful vapors. Use solvent only in a well ventilated area. Avoid prolonged breathing of solvent vapors. Keep solvent away from flame. Do not use solvent in excessive amounts.

Step 1. Clean all parts and cylinder head mating surface with solvent. Dry all parts.
Step 2. Inspect cylinder head cover for damage. Replace damaged cylinder head cover.
Step 3. Inspect cylinder head cover gasket for damage. Replace damaged cylinder head cover gasket.
Step 4. Inspect cylinder head cover mounting studs for damage. Repair or replace damaged mounting studs.

c. Replace.

Step 1. Put gasket on cylinder head cover.
Step 2. Put on cylinder head cover.
Step 3. Put on four mounting nuts. Torque nuts to 11 lb. ft. (15 Nm).
Step 4. Put on crankcase ventilation pipe at cylinder head cover and air intake at turbocharger.
Step 5. Attach linkage to cylinder head cover.



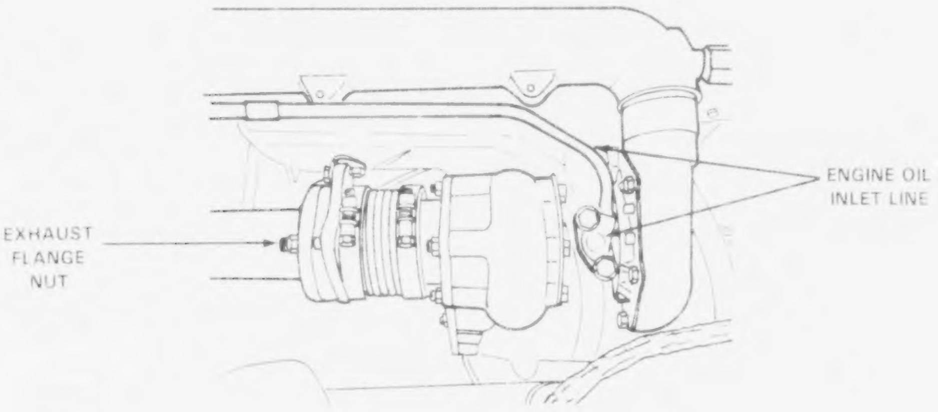
Step 6. Adjust accelerator linkage. Refer to paragraph 3-13.
Step 7. Put on engine hood.

TA259343

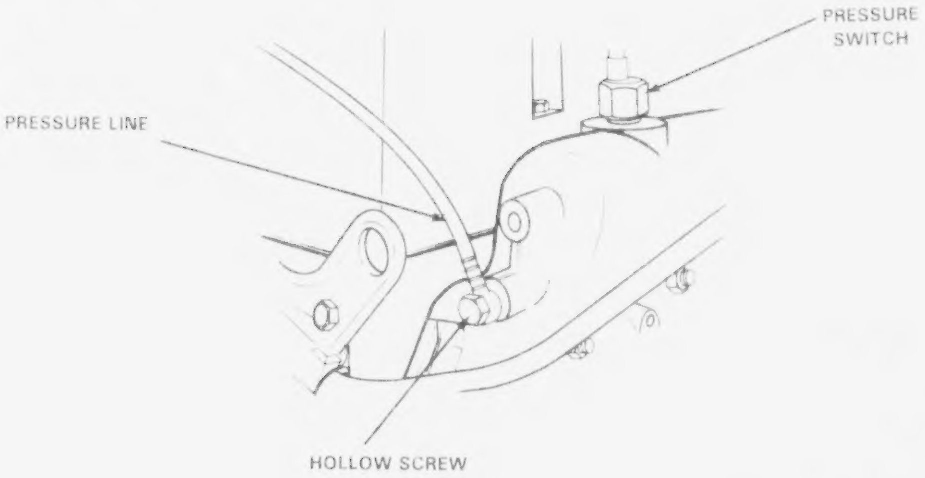
3-177. REMOVE AND REPLACE INTAKE AND EXHAUST MANIFOLDS.

a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Remove heat shield.
Step 3. Remove crankcase ventilation pipe from cylinder head cover and air intake at turbocharger.
Step 4. Disconnect air cleaner hose from turbocharger.
Step 5. Disconnect engine oil inlet line from turbocharger.
Step 6. Loosen and remove exhaust flange nuts.

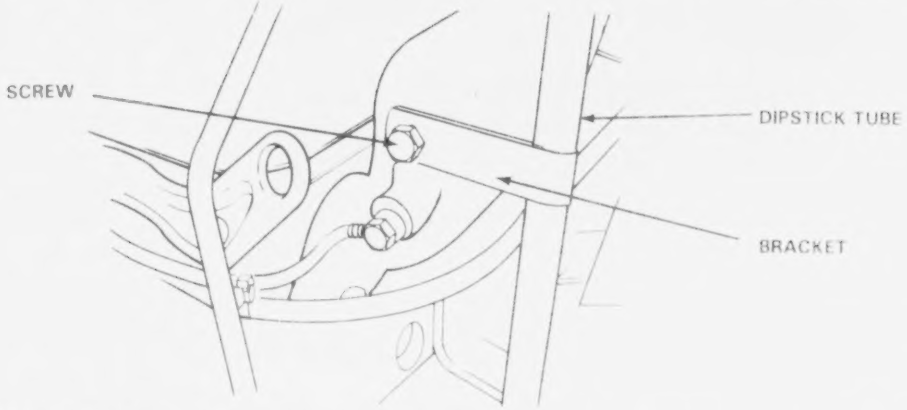

ENGINE OIL INLET LINE
EXHAUST FLANGE NUT

Step 7. Disconnect exhaust clamp from transmission bracket, and muffler inlet.
Step 8. Remove exhaust pipe.
Step 9. Disconnect electrical wire from turbocharger pressure switch.
Step 10. Disconnect pressure line on intake manifold.


PRESSURE SWITCH
PRESSURE LINE
HOLLOW SCREW

TA259344

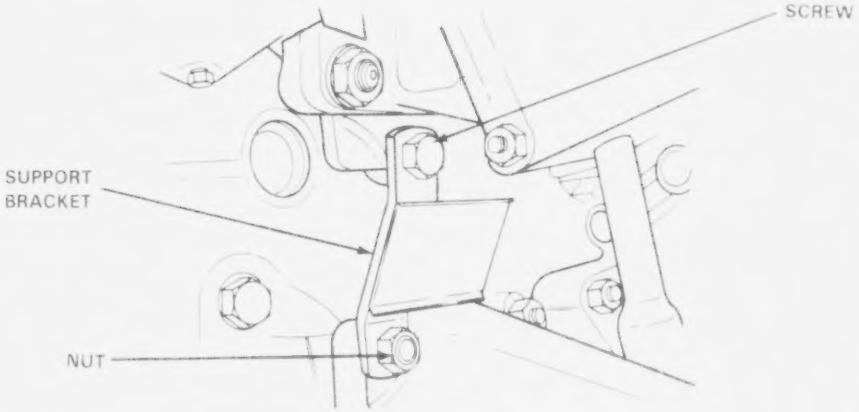
Step 11. Disconnect automatic transmission oil dipstick tube bracket from intake manifold.


SCREW
DIPSTICK TUBE
BRACKET

Step 12. Loosen and remove hollow screw and seals from turbocharger oil line at oil filter and turbocharger.

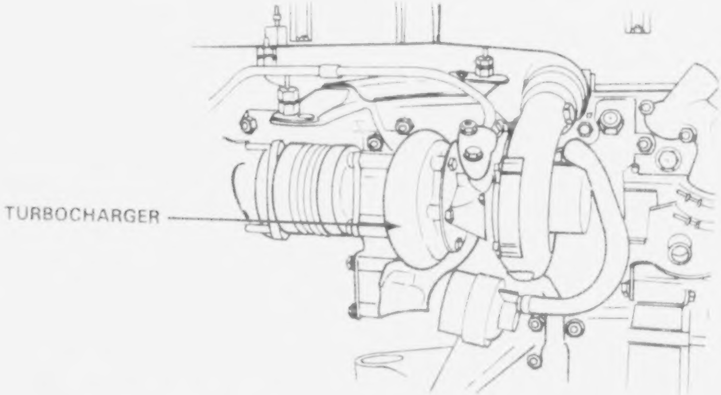
Step 13. Disconnect turbocharger oil line clamp on rear engine lifting bracket. Remove oil line.

Step 14. Disconnect supporting bracket for exhaust manifold.


SCREW
SUPPORT BRACKET
NUT

Step 15. Loosen and remove nuts from intake and exhaust manifold flanges.

Step 16. Remove intake and exhaust manifold and turbocharger.


TURBOCHARGER

TA259345

Step 17. Inspect cylinder head mounting surfaces for damage, burnt areas and damaged threads.

Step 18. Clean intake and exhaust manifold cylinder head mounting surfaces.

NOTE

Step 19 is for the intake manifold.
Step 20 is for the exhaust manifold.

Step 19. Remove nuts from intake manifold. Remove manifold.

Step 20. Remove nuts from exhaust manifold. Remove manifold.

b. **Replace.**

Step 1. Clean mating surfaces of manifolds.

Step 2. Transfer components from unserviceable to serviceable manifold.

NOTE

Steps 2 and 3 are for the intake manifold.
Steps 4 and 5 are for the exhaust manifold.

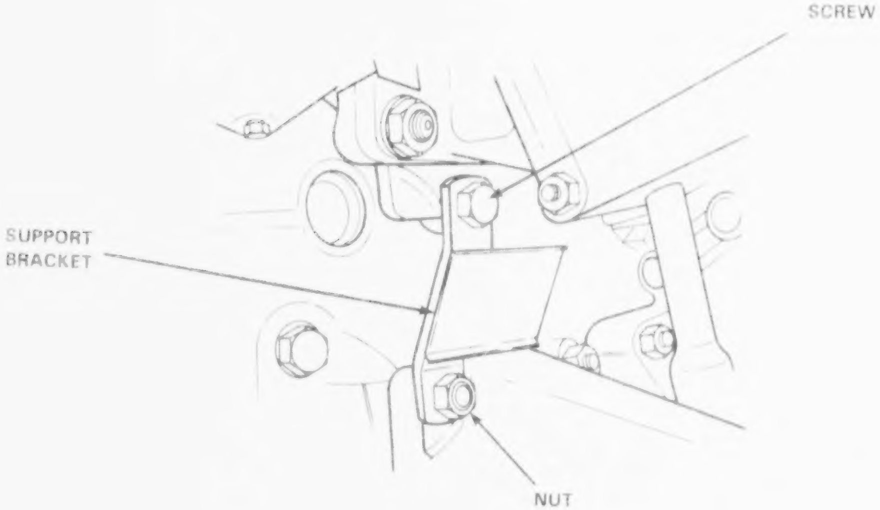
Step 3. Put gasket and intake manifold in place.

Step 4. Put on nuts. Tighten nuts.

Step 5. Put gasket and exhaust manifold in place.

Step 6. Put on nuts. Tighten nuts.

Step 7. Connect supporting bracket for exhaust manifold. Tighten screw and nut.



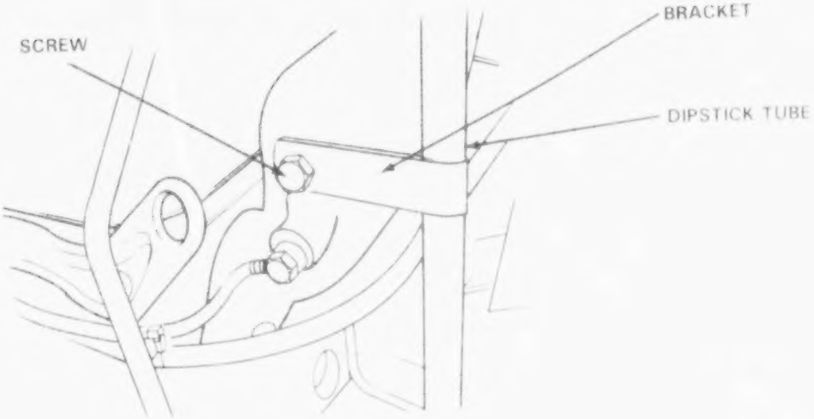
TA259346

Step 8. Put turbocharger oil line in place.

Step 9. Connect turbocharger oil line clamp on rear engine lifting bracket.

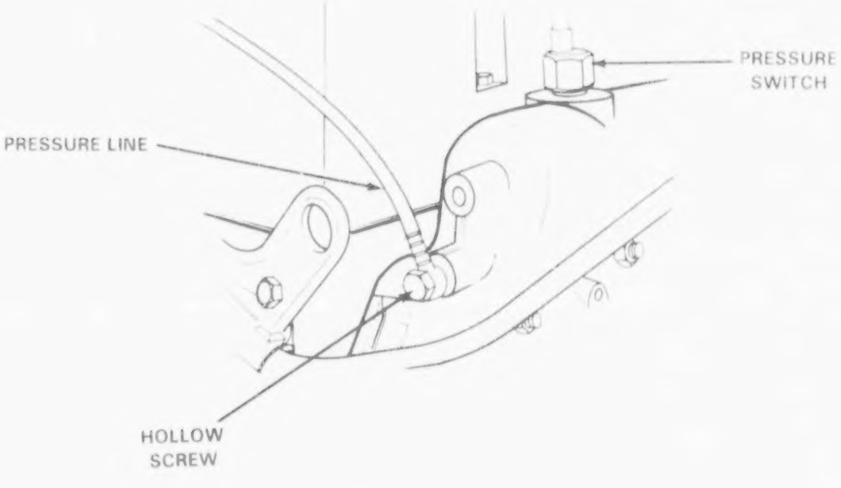
Step 10. Put turbocharger oil line at oil filter in place with hollow screw and seals. Tighten screw.

Step 11. Connect automatic transmission oil dipstick tube bracket in intake manifold. Tighten screw.


SCREW
BRACKET
DIPSTICK TUBE

Step 12. Connect pressure line to switch over valve on intake manifold. Tighten screw.

Step 13. Connect electrical wire to turbocharger pressure switch.


PRESSURE SWITCH
PRESSURE LINE
HOLLOW SCREW

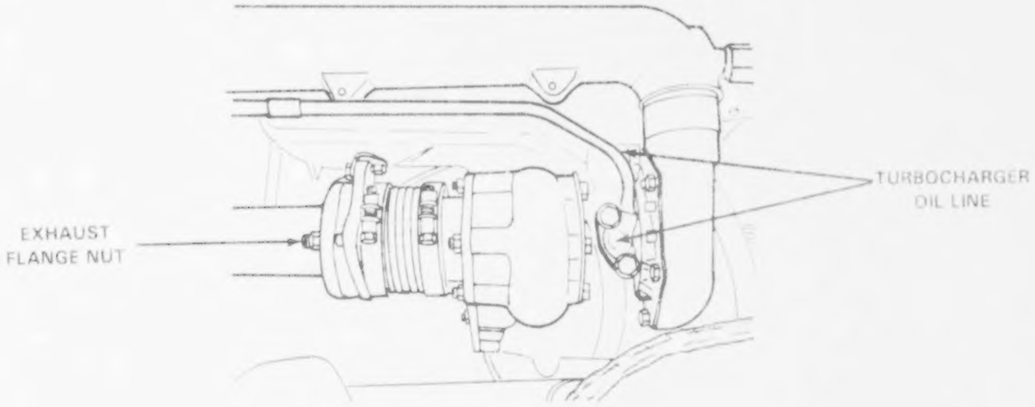
TA259347

Step 14. Put exhaust pipe in place with muffler and turbocharger.

Step 15. Connect exhaust clamp at muffler inlet and transmission bracket. Tighten clamps.

Step 16. Put on exhaust flange nuts. Tighten nuts.

Step 17. Use new gasket. Connect turbocharger oil line to turbocharger. Tighten screws and clamps.



Step 18. Connect air cleaner hose to turbocharger.

Step 19. Put crankcase ventilation pipe from cylinder head cover and air intake at turbocharger in place.

Step 20. Put heat shield in place. Tighten nuts.

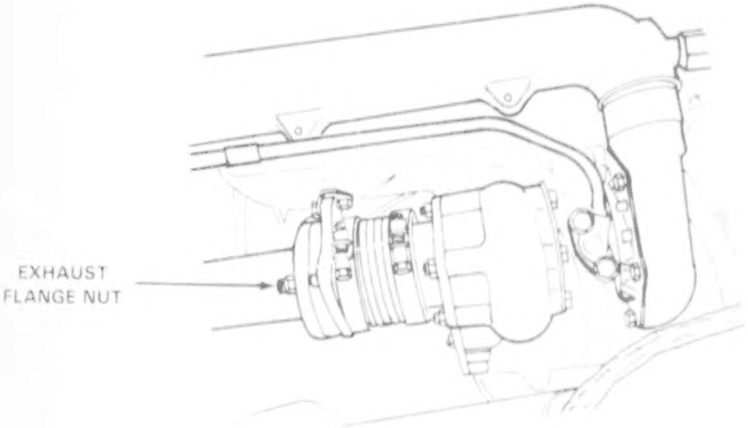
Step 21. Replace engine cover and hood.

TA259348

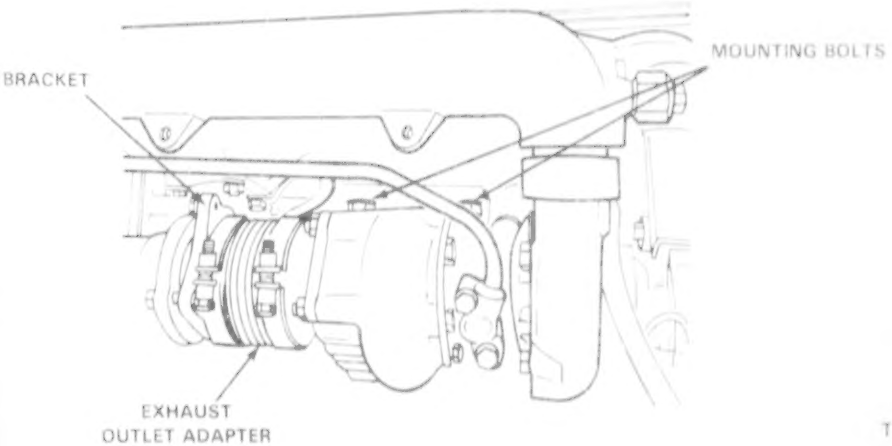
3-178. REMOVE AND REPLACE TURBOCHARGER.

a. Remove

Step 1. Remove engine hood and cover.
Step 2. Remove heat shield.
Step 3. Remove crankcase ventilation pipe from cylinder head cover and air intake at turbocharger.
Step 4. Disconnect air cleaner hose from turbocharger.
Step 5. Disconnect engine oil inlet line from turbocharger.
Step 6. Loosen and remove exhaust flange nuts.



Step 7. Disconnect exhaust clamp from transmission bracket and muffler inlet.
Step 8. Remove exhaust pipe.
Step 9. Disconnect bracket at turbocharger exhaust flange.
Step 10. Remove four turbocharger mounting nuts.
Step 11. Remove turbocharger.
Step 12. Remove exhaust flange gasket.
Step 13. Remove exhaust outlet adapter from turbocharger.



TA259456

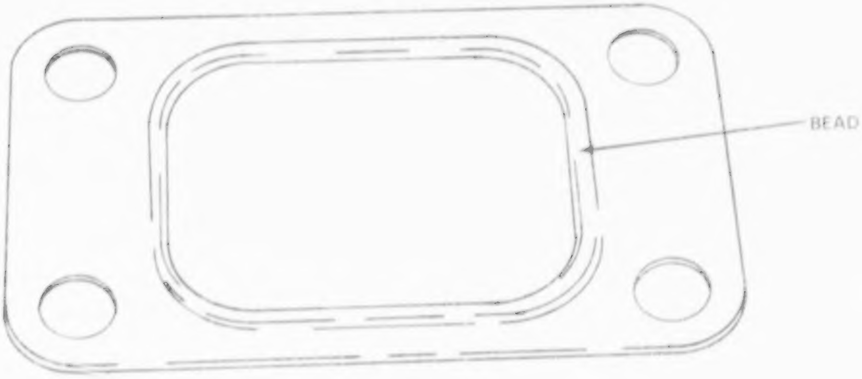
b. Replace.

Step 1. Put exhaust oulet adapter in place on turbocharger and tighten clamp.

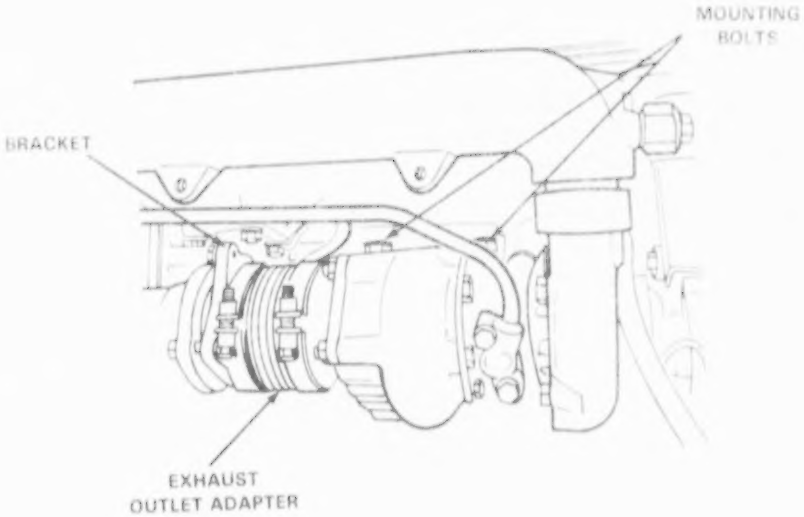
NOTE

Flange gasket bead must go towards the exhaust manifold side.

Step 2. Use new exhaust flange gasket. Put turbocharger in place.



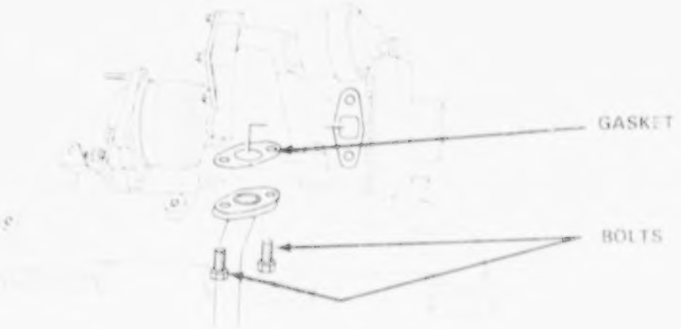
Step 3. Put in four mounting bolts. Tighten bolts.
Step 4. Connect bracket at turbocharger exhaust flange.


MOUNTING BOLTS
BRACKET
EXHAUST OUTLET ADAPTER

TA259457

Step 5. Use new gasket. Put oil return pipe assembly in place on turbocharger.

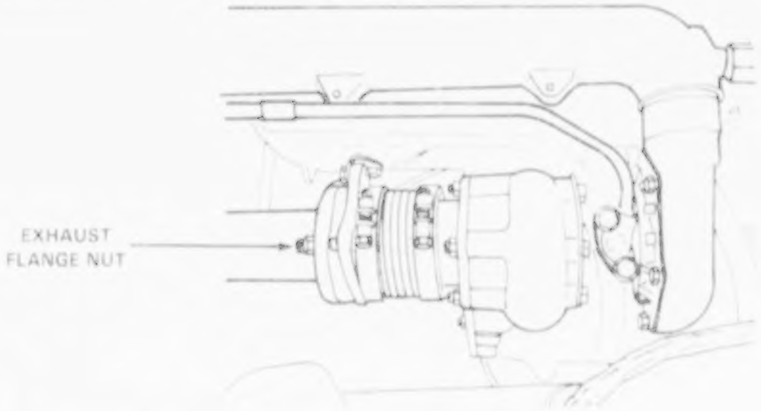
Step 6. Put in two bolts. Tighten bolts.


GASKET
BOLTS

Step 7. Put exhaust pipe in place.

Step 8. Connect exhaust clamp from transmission bracket and muffler inlet.

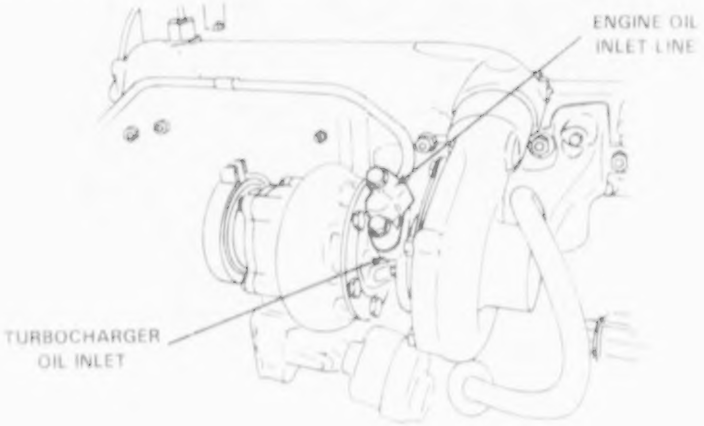
Step 9. Put on exhaust flange nuts. Tighten nuts.


EXHAUST
FLANGE NUT

Step 10. Fill turbocharger with ⅛ qt. (.118 liter) engine oil through turbocharger oil inlet.

Step 11. Use new gasket. Connect engine oil inlet line to turbocharger.

Step 12. Put in two bolts. Tighten bolts.


ENGINE OIL
INLET LINE
TURBOCHARGER
OIL INLET

TA259458

Step 13. Connect air cleaner hose to turbocharger.

Step 14. Install crankcase ventilation pipe to cylinder head cover and air intake at turbocharger.

Step 15. Install heat shield.

Step 16. Replace engine cover and hood.

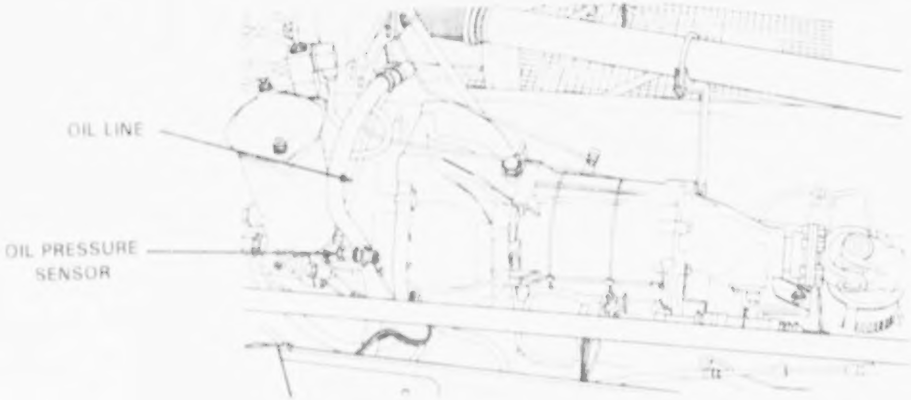
3-179. REMOVE AND REPLACE ENGINE OIL FILTER HOUSING.

a. Remove.

Step 1. Remove engine oil filter. Refer to paragraph 3-4.

Step 2. Disconnect electrical wire at oil pressure sensor.

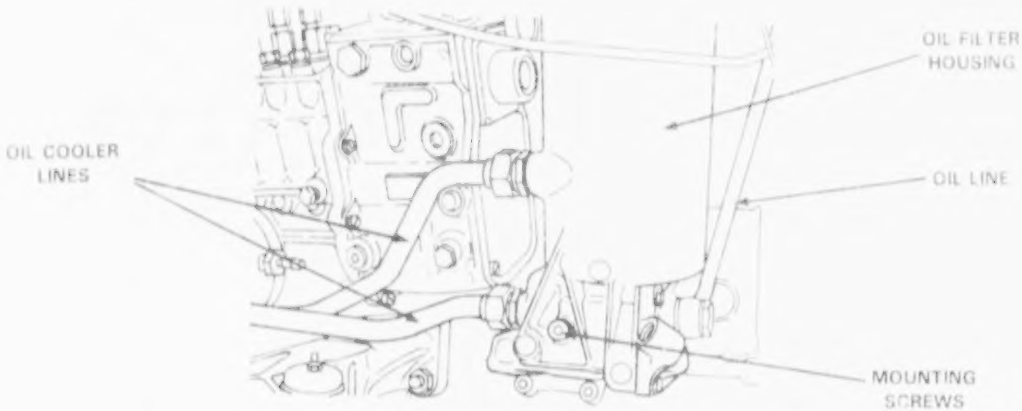
Step 3. Disconnect oil line at oil pressure sensor.


OIL LINE
OIL PRESSURE SENSOR

Step 4. Disconnect oil cooler lines.

Step 5. Disconnect oil feed line to turbocharger.

Step 6. Remove five mounting screws. Remove oil filter housing.

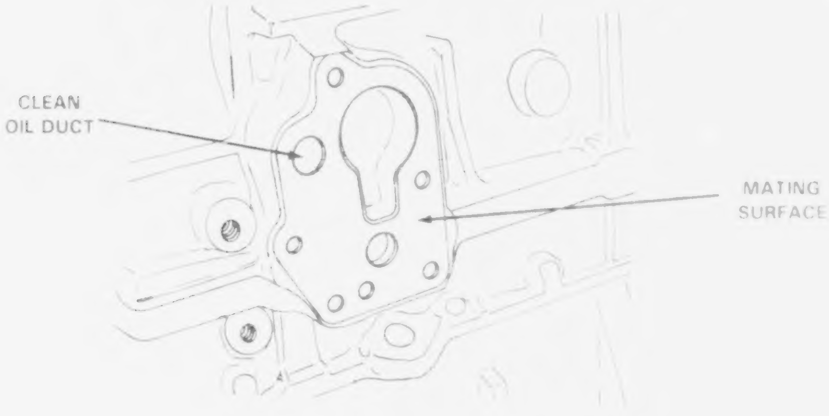

OIL FILTER HOUSING
OIL COOLER LINES
OIL LINE
MOUNTING SCREWS

TA259558

CAUTION

Particles from gasket dropping into clean oil duct may be flushed by the oil to the oil spray nozzles and plug the bore. A plugged oil spray nozzle will result in engine damage.

Step 7. Plug and clean oil duct.
Step 8. Clean mating surfaces of oil filter housing and engine block.



b. Replace.

Step 1. Remove plug from oil duct.
Step 2. Put gasket and oil filter housing in place.
Step 3. Put in mounting screws. Torque screws 5 to 18 lb. ft. (15 to 25 N·m).
Step 4. Put oil feed line to turbocharger in place.
Step 5. Put hollow screw and gaskets in place. Tighten screw.
Step 6. Put oil cooler lines in place. Tighten connections.
Step 7. Put oil line in place at oil sensor. Tighten connections.
Step 8. Connect electrical wire to oil sensor.
Step 9. Replace engine oil filter. Refer to paragraph 3-4.

3-180. REMOVE AND REPLACE LOWER OIL PAN.

a. Remove.

Step 1. Remove power pack. Refer to paragraph 3-2.
Step 2. Support engine on cribbing.
Step 3. Drain engine oil. Refer to paragraph 3-6.
Step 4. Remove lower oil pan screws. Remove lower oil pan.
Step 5. Clean oil pan mating surfaces.

TA259552

b. Replace.

Step 1. Coat top flat surface of oil pan with sealing compound.
Step 2. Put new gasket on lower oil pan.
Step 3. Put oil pan in place. Put in screws. Torque screw to 7 lb. ft. (10 Nm).
Step 4. Fill engine with oil. Refer to LO 9-2350-272-12.
Step 5. Replace power pack. Refer to paragraph 3-2.

3-181. REMOVE AND REPLACE DIPSTICK TUBE.

a Remove.

Step 1. Remove lower oil pan. Refer to paragraph 3-180.
Step 2. Remove dipstick.
Step 3. Remove nut holding dipstick tube clamp in place.
Step 4. Tap out dipstick tube.

b. Replace.

Step 1. Tap dipstick tube in place.
Step 2. Put dipstick tube clamp in place. Put on and tighten nut.
Step 3. Put dipstick in dipstick tube.
Step 4. Replace lower oil pan.

3-182. REMOVE AND REPLACE GLOW PLUG.

a Remove.

Step 1. Remove engine hood.
Step 2. Loosen and remove nut and washer from glow plug terminal.
Step 3. Disconnect wire from glow plug terminal.
Step 4. Loosen and remove glow plug.

b. Replace.

Step 1. Put in glow plug. Tighten glow plug.
Step 2. Connect wire to glow plug terminal.
Step 3. Put on washer and nut. Tighten nut.
Step 4. Put on engine hood.

TA259553

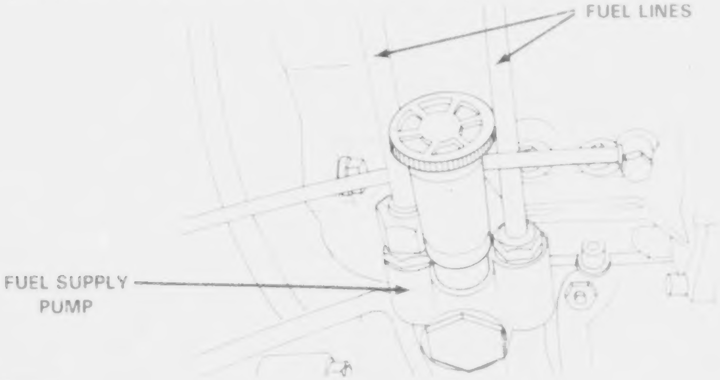
3-183. TEST GLOW PLUG.

Step 1. Remove engine hood.
Step 2. Disconnect electrical wire from glow plug.
Step 3. Make continuing check between glow plug terminal and engine block.
Step 4. Ohmmeter must read "0" ohms. If resistance is indicated glow plug is defective. Replace defective plug.
Step 5. Connect electrical wire to glow plug.
Step 6. Replace engine hood.

3-184. REMOVE AND REPLACE FUEL SUPPLY PUMP.

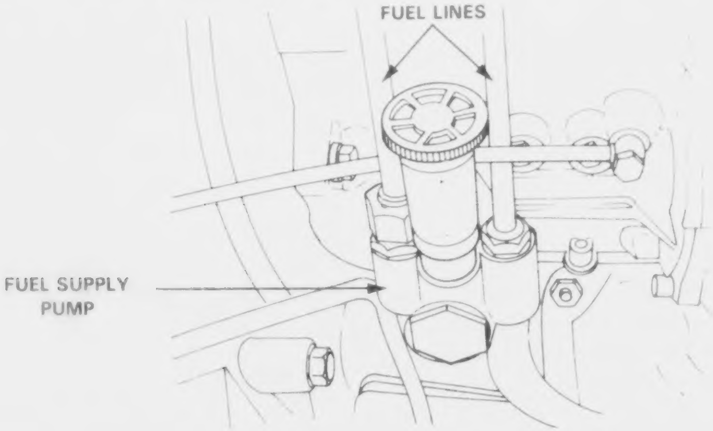
a. Remove.

Step 1. Remove engine hood and cover.
Step 2. Disconnect fuel lines.
Step 3. Remove fuel supply pump retaining nuts.
Step 4. Remove fuel supply pump.
Step 5. Clean fuel supply pump mounting on injector pump.



b. Replace.

Step 1. Use new gasket. Put fuel supply pump in place.
Step 2. Put on fuel pump retaining nuts. Tighten nuts.
Step 3. Connect fuel lines.
Step 4. Replace engine cover and hood.



TA259554

3-185. REMOVE AND REPLACE FUEL FILTER HOUSING.

a. Remove.

Step 1. Remove engine hood.
Step 2. Tag and disconnect all fuel lines from fuel filter.
Step 3. Remove housing mounting screws and washers.
Step 4. Remove fuel filter housing.

b. Replace.

Step 1. Put fuel filter housing in place.
Step 2. Put in and tighten mounting screws and washers.
Step 3. Connect and tighten fuel lines. Remove tags
Step 4. Bleed fuel system. Refer to paragraph 3-9.
Step 5. Replace engine hood.

3-186. REMOVE AND REPLACE FUEL NOZZLE LINES.

CAUTION

Do not bend fuel nozzle lines.

a Remove.

Step 1. Remove engine hood.
Step 2. Remove clamps from lines being removed.
Step 3. Loosen line nut at fuel metering pump.
Step 4. Loosen line nut at injector nozzle.
Step 5. Remove nozzle line.

b. Replace.

Step 1. Put nozzle line in place.
Step 2. Tighten line nut at injector nozzle.
Step 3. Tighten line nut at fuel metering pump.
Step 4. Put on and tighten line clamps.
Step 5. Replace engine hood.

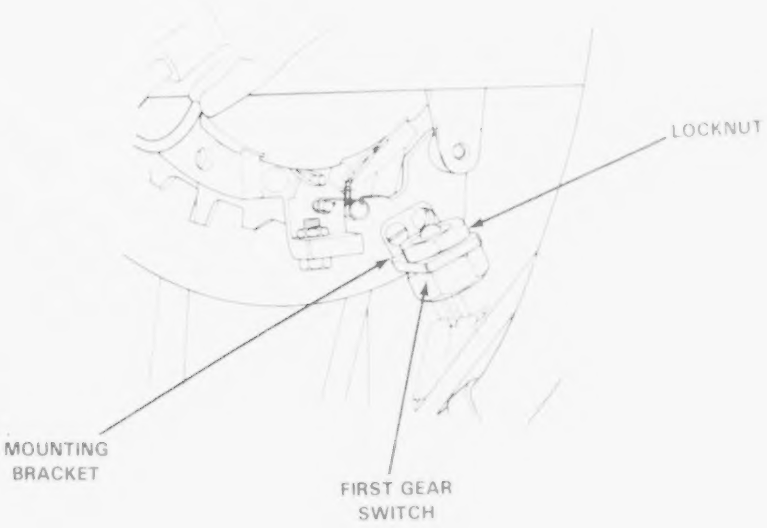
3-187. REMOVE AND REPLACE AUTOMATIC TRANSMISSION FIRST GEAR SWITCH.

a. Remove.

Step 1. Remove left side engine access cover.
Step 2. Tag and disconnect electrical wires from first gear switch.
Step 3. Remove locknut from switch.
Step 4. Remove switch.

b. Replace.

Step 1. Put first gear switch in mounting bracket.
Step 2. Put locknut on switch. Tighten locknut.
Step 3. Connect electrical wires to switch. Remove tags.
Step 4. Replace left side engine access cover.



TA259555

Section IX. ACCESSORY ITEMS MAINTENANCE INSTRUCTIONS

3-188. REMOVE AND REPLACE WINCH CABLE.

WARNING

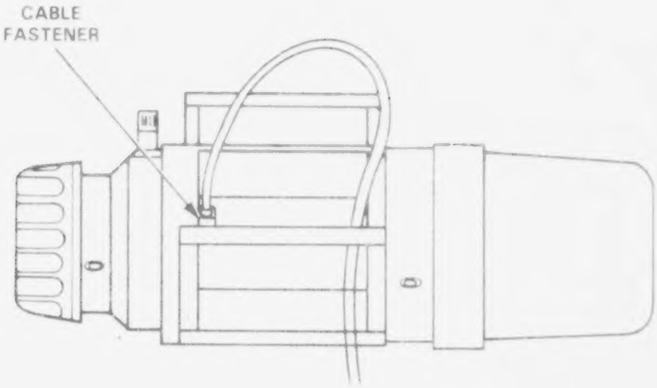
Always wear heavy gloves when handling winch cables. Never let cables run through your hands; frayed cables can cut you.

a. Remove.

Step 1. Pull cable all the way out. Refer to TM 9-2350-272-10 for operation of winch.
Step 2. Remove screws in winch cable fastener. Remove cable and fastener.

b. Replace.

Step 1. Put cable and fastener in place.
Step 2. Screw in and tighten screws in winch cable fastener.
Step 3. Wind winch cable onto winch drum. Refer to TM 9-2350-272-10.



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APPENDIX A
REFERENCES

A-1. SCOPE.

Appendix A has five lists:

- Forms
- Departments of the Army Pamphlets
- Field Manuals
- Technical Manuals
- Other Publications

A-2. FORMS.

Refer to DA Pamphlet 310-1 for index of blank forms. Refer to DA PAM 738-750 for required maintenance forms and explanation on use.

A-3. DEPARTMENT OF THE ARMY PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms	DA PAM 310-1
The Army Maintenance Management System (TAMMS)	DA PAM 738-750

A-4. FIELD MANUALS.

Camouflage	FM 5-20
Explosives and Demolitions	FM 5-25
Operation and Maintenance of Ordnance Material in Cold Weather (0° -65°F)	FM 9-207
Vehicle Recovery Operations	FM 20-22
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71

A-5. TECHNICAL MANUALS.

Chemical, Biological and Radiological (CBR) Decontamination	TM 3-220
Painting Instructions for Field Use	TM 9-213
Use and Care of Hand Tools	TM 9-243
Principles of Automotive Venicles	TM 9-8000
Operator Manual for Carrier, Cargo, Tracked, 1½ Ton, M973	TM 9-2350-272-10
Repair Parts and Special Tools List for Carrier, Cargo, Tracked, 1½ Ton, M973	TM 9-2350-272-24P
Preservation, Packaging, and Packing of Military Supplies and Equipment	TM 38-230-2
Administrative Storage of Equipment	TM 740-90-1
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use	TM 750-244-6
Lead-Acid Storage Batteries	TM 9-6140-200-14

A-6. OTHER PUBLICATIONS

Lubrication Order for Carrier, Cargo, Tracked, 1½ Ton, M973	LO 9-2350-272-12
Winterization Kits for Army Tank-Automotive Material	SB 9-16
Color and Marking of Army Material	TB 746-93-1
Use of Antifreeze Solutions and Cleaning Compound in Engine Cooling Systems	TB 750-651

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility of the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate and/or replace), including fault location/troubleshooting. Fault locate/troubleshoot — the process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT); removal/installation, and disassembly/assembly; Disassemble/assemble — encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned as SMR code) for the category of maintenance under consideration; procedures and maintenance actions; Actions — welding, grinding, riveting, straightening, facing, remachinery, and/or resurfacing; to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as rquired by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/mile, etc.) considered in classifying Army equipments/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1. Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with next higher assembly. End item group number shall be "00".

b. Column 2. Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3. Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2.

d. Column 4. Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C Operator or crew
O Organizational Maintenance
F Direct Support Maintenance
H General Support Maintenance
D Depot Maintenance

e. Column 5, Tools and Equipment. Specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
01									
0100	ENGINE	INSPECT	0.08						
		TEST			0.33				
		SERVICE	0.20	0.45				1	
		ADJUST			0.50			117, 118	
		REPLACE			0.67				
		REPAIR		2.00	6.00	1.50		2, 3, 48, 119 thru 126	
0101	CYLINDER HEAD ASSEMBLY	TEST			0.20				
		REPLACE			1.50			2, 3, 121	
		REPAIR				2.75		2, 3, 48, 117 thru 123	
	ENGINE BLOCK	REPAIR				0.50			
0102	CRANKSHAFT	INSPECT				0.15			
		REPLACE				1.50			
	INERTIA DAMPER	INSPECT				1.50			
		REPLACE				1.50		124	
0103	FLYWHEEL AND FOLLOWER	REPLACE			7.50				
0104	PISTON CONNECTION ROD	INSPECT				0.05			
		REPLACE				0.15			
		REPAIR				1.50			
0105	CAMSHAFT	ADJUST			2.00			2, 3, 117, 118	
		REPLACE				1.00		2, 3, 121	
		REPAIR				1.00			
	VALVE, INTAKE	ADJUST			0.50			117, 118	

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Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	 O	 F	 H	 D	(5) TOOLS AND EQPT.	(6) REMARKS
	VALVE, EXHAUST	ADJUST			0.50			117, 118	
	SPRINGS, VALVE	INSPECT REPLACE			0.30	 1.50		 117, 118	
0106	OIL FILTER ASSEMBLY	REPLACE REPAIR		0.50 0.33					
	OIL FILTER THERMOSTAT	TEST REPLACE			0.20 0.40				
0108	MANIFOLDS	REPLACE		0.75					
0120	POWER PACK	REPLACE REPAIR		6.00	 6.00			70, 72	A
03									
03	FUEL SYSTEM	SERVICE ADJUST REPAIR		0.30 0.45 1.30				 125 2, 3	
0301	NOZZLE HOLDER	TEST REPLACE REPAIR			0.30 0.20	 0.25			
0302	PUMP, FUEL METERING	TEST ADJUST REPLACE			1.00 0.15 1.50			125	
	FILTER ELEMENT, AIR	SERVICE REPLACE		0.15 0.15					
	PUMP, FUEL, CAM ACTUATED	TEST REPLACE		0.10 0.15					
0304	AIR CLEANER	SERVICE REPLACE		0.50 1.00					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0305	TURBOCHARGER	TEST		0.25					
		REPLACE		0.50					
0306	FUEL TANK ASSEMBLY	REPLACE		1.00					
		REPAIR		1.30					
0309	FUEL SEDIMENT BOWL	SERVICE		0.15					
		REPLACE		0.15					
0311	GLOW PLUG	TEST		0.10					
		REPLACE		0.25					
0312	CONTROL PEDAL ASSEMBLY	REPAIR		1.00					
		ADJUST		0.25					
	ACCELERATOR LEVER	REPLACE		0.50					
		ADJUST		0.25					
04									
04	EXHAUST SYSTEM	REPAIR		0.50					
0401	MUFFLER	REPLACE		1.00					
05									
05	COOLING SYSTEM, ENG.	INSPECT	0.05						
		SERVICE		0.45					
0501	RADIATOR	REPLACE		1.50					
		REPAIR			1.00				
0503	THERMOSTAT, ENGINE	REPLACE		0.30					
0504	WATER PUMP ASSEMBLY	REPLACE		2.00					
		REPAIR			0.33				

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0505	V-BELTS	REPLACE		0.50					
		ADJUST		0.10					
	IMPELLER ASSEMBLY	REPLACE		2.00					
		REPAIR		2.25					
06									
06	ELECTRIC SYSTEM	TEST		0.10					
		REPAIR		1.00					
0601	ALTERNATOR	TEST		0.10					
		REPLACE		0.50					
		REPAIR			0.75				
	V-BELTS	REPLACE		0.50					
		ADJUST		0.10					
0603	STARTER MOTOR	TEST			0.50				
		REPLACE		0.25					
		REPAIR			1.00				
	CONTACT, STARTER INTERLOCK	TEST		0.50					
		ADJUST		0.20					
		REPLACE		0.50					
0607	INSTRUMENT PANEL	REPLACE		0.75					
		REPAIR		0.75					
	LIGHT, INDICATOR	TEST		0.10					
		REPLACE		0.50					
	GAGE, FUEL PRESSURE	TEST		0.15					
		REPLACE		0.50					
	GAGE, COOLANT TEMPERATURE	TEST		0.15					
		REPLACE		0.50					
	SWITCH IGNITION	TEST		0.10					
		REPLACE		0.50					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
	CONTROL PANEL	REPLACE		0.33					
		REPAIR		0.33					
	SWITCH, PARKING BRAKE	TEST		0.25					
		REPLACE		0.15					
	SWITCH PANEL REAR CAR	REPLACE		0.33					
		REPAIR		0.33					
0608	RHEOSTAT	TEST		0.10					
		REPLACE		0.50					
	SWITCH BLACKOUT	TEST		0.10					
		REPLACE		0.50					
	FLASHER, THERMAL	TEST		0.50					
		REPLACE		0.10					
	JUNCTION BOX ASSEMBLY	REPLACE		0.75					
		REPAIR		0.33					
	SWITCH, MAIN RELAY	TEST		0.15					
		REPLACE		1.30					
	FRESH AIR HEATER FRONT CAR	INSPECT	0.05						
		REPLACE		0.50					
		REPAIR		0.17					
	SWITCH, TRANSMISSION FIRST GEAR	TEST		1.00					
		REPLACE		1.00					
	SWITCH, DIRECTIONAL	TEST		0.25					
		REPLACE		0.33					
	RELAY	TEST		0.33					
		REPLACE		0.50					
0609	HEADLIGHT	TEST		0.10					
		ADJUST		0.50					
		REPLACE		0.25					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
	LAMP INCANDESCENT	TEST		0.25					
		REPLACE		0.25					
	CAB LIGHT ASSEMBLY FRONT AND REAR CAR	REPLACE		0.33					
		REPAIR		0.33					
0610	SPEEDOMETER SENSOR	ADJUST		0.50					
		REPLACE		1.00					
	SWITCH, BRAKE WARNING	TEST		0.10					
		REPLACE		0.50					
	SWITCH, BRAKE LIGHT	TEST		0.12					
		REPLACE		0.12					
0611	HORN	REPLACE		0.33					
0612	BATTERY	INSPECT		0.06					
		TEST		0.12					
		SERVICE		0.12					
		REPLACE		0.50					
		REPAIR			1.00				
	BATTERY CABLE ASSEMBLY	REPLACE		0.08					
		REPAIR		0.08					
0613	WIRING HARNESS	REPLACE		3.00					
		REPAIR		1.35					
07									
0705	GEAR SHIFTING SYSTEM	ADJUST		0.33					
		REPLACE		0.67					
		REPAIR		0.50					
	BRACKET	REPLACE		0.17					
		REPAIR		0.17					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
	SHIFT LINKAGE	ADJUST		0.08					
		REPLACE		0.33					
0708	TORQUE CONVERTER	REPLACE			0.08				
		REPAIR			0.25				
0710	TRANSMISSION	INSPECT	0.07						
		TEST			0.45				
		SERVICE		8.00					
		ADJUST		0.50	0.42				
		REPLACE			0.50				
		REPAIR			1.00	3.00		7, 9, 11, 12, 18, 81 thru 84, 86 thru 92, 126, 127, 134	
	PLANETARY GEAR ASSEMBLY	REPLACE				1.50			
		REPAIR				1.75			
	TRANSMISSION FRONT AND REAR HOUSING	REPAIR				1.75		18, 81, 82, 83, 86, 90, 126, 134	
	CLUTCH K1 AND K2	REPLACE				1.50		84, 89	
		REPAIR				1.75			
0721	OIL FILTER TRANSMISSION	REPLACE		7.30					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
08									
0801	TRANSFER GEARBOX	SERVICE	0.10						
		REPLACE		1.50				26, 27, 30	
		REPAIR				1.50		8, 10, 16, 41, 93 thru 99, 126, 128 130, 132	
	OUTPUT SHAFT SEALS	REPLACE			0.75			8, 10, 41	
0803	TRANSFER SHIFT ROD ASSEMBLY	ADJUST		0.15					
		REPLACE		1.00					
09									
0900	PROPELLER SHAFT	REPLACE		0.25				46, 130	
		REPAIR		0.25					
10									
1002	DIFFERENTIAL FRONT	INSPECT		0.15					
		SERVICE	0.20						
		REPLACE		1.50					
		REPAIR				1.50		4, 5, 6, 13, 14 15, 17, 100 thru 116, 126, 128	
11									
1102	DIFFERENTIAL, REAR	INSPECT		0.15					
		SERVICE	0.20						
		REPLACE		3.00					
		REPAIR				1.50		4, 5, 6, 13, 14, 15, 17, 100 thru 116, 126, 128	

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
12									
1201	PEDAL UNIT	REPAIR		0.50					
	PARKING BRAKE PEDAL ASSEMBLY	ADJUST		0.35					
		REPLACE		0.50					
1202	BRAKE ASSEMBLY	REPLACE		1.00				19 thru 30, 128	
		REPAIR		0.50					
	BRAKE SYSTEM	INSPECT		0.20					
		REPAIR		1.00					
1204	HYDRAULIC BRAKE MASTER CYLINDER	SERVICE		0.15					
		REPLACE		0.33					
		REPAIR			0.50				
	BRAKE CALIPERS	REPLACE		0.30				21, 22	
		REPAIR			0.50				
1206	BRAKE PEDAL ASSEMBLY	REPLACE		0.10					
		REPAIR		0.50					
13									
1301	TRACK FRAME SUPPORT	REPLACE			4.50			56 thru 67	
		REPAIR				0.30		56 thru 67	
	ARM ASSEMBLY PIVOT	REPLACE		0.50				44, 45, 47 50 131	
		REPAIR		0.10					
1302	SUPPORT WHEEL ASSEMBLY	REPLACE		0.10				50	
		REPAIR		0.10				33, 49, 50, 126, 129, 133	
	SUPPORT WHEEL	REPLACE		0.33					
		REPAIR		0.25					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
1303	TRACK TENSIONER	INSPECT		0.17					
		ADJUST		0.17				55	
		REPLACE		2.50				50, 55	
	TENSIONING WHEEL	REPLACE		0.75					
		REPAIR		0.85					
1304	SPROCKET ASSEMBLY	REPLACE		1.00				46, 51, 52, 53, 54, 130	
1305	TRACK ASSEMBLY, VEHICLE	ADJUST	0.17						
		REPLACE	4.50						
		REPAIR		0.08					
1311	WHEEL ASSEMBLY	REPLACE		0.25				50	
		REPAIR		0.25				33, 49, 50, 126, 129, 133	
14									
1400	STEERING SYSTEM	INSPECT		0.11					
		TEST			2.00			68, 69, 71, 73 thru 80	
		SERVICE		0.20					
		REPAIR		0.50					
1405	ACCUMULATOR	SERVICE		0.15					
	LINK	REPLACE			0.50			31, 38, 68, 130	
		REPAIR			1.30			32, 39, 40, 68, 128	
	TORSION MEMBER	REPLACE			1.50			68	
		REPAIR			1.50			36, 38, 42, 43, 128, 130	
	STEERING GEAR ASSEMBLY, VEHICLE	REPLACE		1.00					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
1410	PUMP, HYDRAULIC	TEST			0.45			71, 73, 78	
		REPLACE		1.00				131	
1411	HYDRAULIC FILTER AND HOUSING	REPLACE		0.65					
1412	CYLINDER ASSEMBLY STEERING, VEHICLE	TEST			0.30			69, 74, 77, 79	
		REPLACE		0.50				31	
		REPAIR			0.50			33, 34, 37, 41	
	DAMPER, MECHANICAL HYDRAULIC STEERING	REPLACE		0.50					
		REPAIR			0.75			33, 35	
1413	TANK, HYDRAULIC FLUID	REPLACE		0.20					
		REPAIR		0.02					
1414	SERVO VALVE	REPLACE			0.30				
		REPAIR			0.50				
	POWER STEER HYDRAULIC VALVE	TEST			0.40			69, 74	
		REPLACE			0.50				
15									
15	FRAME COMPONENTS	INSPECT	0.25						
		REPAIR		1.36					
1501	CHASSIS ASSEMBLY FRONT AND REAR	INSPECT		0.17					
		REPLACE			1.50				
		REPAIR			14.83				
1503	TOWING HOOK	INSPECT	0.05						
		REPLACE		0.33					
		REPAIR		0.05					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
16									
1601	LEAF SPRINGS	REPLACE			2.50				
18									
1801	BODY FRONT CAR	INSPECT REPLACE REPAIR	0.10		 2.00	 4.50			
	BODY REAR CAR	INSPECT REPLACE REPAIR	0.07		 2.00	 4.00			
	REAR GRILLE	REPLACE REPAIR		0.08 0.05					
	ROOF HATCH, REAR	REPLACE REPAIR		0.13 0.08					
	ROOF HATCH, FRONT	REPLACE REPAIR		0.13 0.08					
	DOOR, HATCH	REPLACE REPAIR		0.40 0.83					
	DOOR LOCK	REPLACE ADJUST		0.25 0.20					
	HATCH SUPPORT	REPLACE REPAIR		0.05 0.05					
	ACCESS COVER ASSEMBLY	REPLACE REPAIR		0.17 0.33					
	FRONT GRILLE	REPLACE REPAIR		0.08 0.05					
1802	SLIDING WINDOW	REPLACE REPAIR		2.00 0.20					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
1806	DRIVER SEAT	REPLACE		0.50					
		REPAIR		0.17					
1808	STOWAGE COMPONENTS	REPLACE		1.00					
20									
2001	WINCH	INSPECT	0.05						
		TEST			0.20				
		SERVICE		0.15					
		INSTALL	0.10						
		REPAIR		0.20	0.50	3.00			
21									
2101	BUMPERS FRONT AND REAR	REPLACE		0.34					
22									
2202	HEATER ASSEMBLY ENGINE	INSPECT	0.05						
		INSTALL	0.20						
		REPAIR		1.00					
	EQUIPMENT BOX	REPLACE		0.17					
		REPAIR		0.08					
	REAR VIEW MIRROR	REPLACE		0.08					
		REPAIR		0.03					
	TANK, WINDSHIELD WASHER	SERVICE	0.05						
		REPLACE		0.30					
		REPAIR		0.45					
	WINDSHIELD WIPER ASSEMBLY	REPLACE		0.33					
		REPAIR		0.45					
2205	BILGE PUMP, FRONT AND REAR CARS	INSPECT		0.10					
		REPLACE		0.35					
		REPAIR		0.50					

Section II. MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
2207	VEHICLE HEATER ASSEMBLY	INSPECT	0.05						
		REPLACE		0.50					
		REPAIR		0.17					
2210	DECALS	REPLACE		0.10					
32									
3200	ENGINE COOLANT/ HEATER COMPONENTS	REPLACE		0.15					
		REPAIR		0.15					
43									
4319	VACUUM PUMP	REPLACE			1.00				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
1	O	SET, SYRINGE	4930-01-177-4538	112589007200
2	F	BOLT, PULLER	5120-01-170-6687	116589013400
3	F	PULLER	5120-01-170-6686	116589203300
4	H	ADAPTER, PULLER	5120-01-166-2004	4537408-016
5	H	ADAPTER, PULLER	5120-01-166-1988	4537408-017
6	H	MANDREL	3460-01-166-2107	4537408-018
7	H	WRENCH, PLUG	5120-01-166-1992	4537408-019
8	F	TOOL, EXTRACTOR	5120-01-204-0280	4537408-020
9	F	FIXTURE	4910-01-167-1735	4537408-021
10	F	PIN, DRIFT	5120-01-166-2076	4537408-022
11	F	WRENCH, TAP	5120-01-170-6727	115589010700
12	H	DEVICE, TESTING	5120-01-170-6677	115589112100
13	H	PIN, DRIFT	5120-01-166-2077	4537408-025
14	H	PIN, DRIFT	5120-01-169-6350	4537408-026
15	H	YOKE	5120-01-167-1787	4537408-027
16	H	DRIFT	5120-01-206-4251	4537408-028
17	H	YOKE	5120-01-167-1741	4537408-029
18	H	TOOL, COMPRESSION	5120-01-166-1990	4537408-031
		DELETED		
20	O	ADAPTER, PULLER	5120-01-166-1986	4537408-034
21	O	WRENCH, RATCHET	5120-01-166-2184	4537408-035
22	O	WRENCH	5120-01-166-2006	4537408-036
23	O	ADAPTER, PULLER	5120-01-166-2001	4537408-038
24	O	ADAPTER	5120-01-166-1997	4537408-039
25	O	DRIFT PIN	5120-01-164-5828	4537408-040
26	O	WRENCH	5120-01-164-5796	4537408-041
27	O	PIN, DRIFT	5120-01-166-2090	4537408-042
28	O	WRENCH, SPANNER	5120-01-166-2072	4537408-043
		DELETED		
30	O	PULLER	5120-01-166-1979	4537408-045
31	O	PULLER	5120-01-166-2155	4537408-046
32	F	CLAMP	5120-01-179-4082	4537408-049
33	O	PIN, DRIFT	5120-01-166-2083	4537408-052
34	F	PIN, DRIFT	5120-01-166-2084	4537408-053
35	F	PIN, DRIFT	5120-01-166-2085	4537408-054
36	F	PIN, DRIFT	5120-01-166-2086	4537408-055
37	F	DRIFT PIN	5120-01-166-2087	4537408-056
38	F	ADAPTER	5120-01-166-1998	4537408-058
39	F	ADAPTER PULLER	5120-01-166-5283	4537408-060
40	F	PIN, DRIFT	5120-01-166-5298	4537408-061

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (CONTINUED)

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
41	F	PIN, DRIFT	5120 01 166 2089	4537408 062
42	F	FIXTURE	3465 01 167 1782	4537408 063
43	F	PULLER	5120 01 166 1993	4537408 064
44	O	PULLER	5120 01 167 1780	4537408 065
45	O	TOOL, ADJUSTING	5120 01 166 1977	4537408 066
46	O	ADAPTER	5120 01 166 2000	4537408 067
47	O	RULE	5120 01 166 5281	4537408 068
48	H	WRENCH, TAP	5120 01 170 6685	615589000700
49	O	PIN, DRIFT	5120 01 167 7254	4537408 070
50	O	PULLER	5120-01-179-4324	4537408 073
51	O	ADAPTER	5120 01 166 1975	4537408 074
52	O	SPACER, SPEC PURPOSE	5365 01 167 1694	4537408 075
53	O	ADAPTER	5120 01 166 1976	4537408 076
54	O	SLEEVE	5120 01 167 1695	4537408 077
55	O	TOOL, ADJUSTING	5120 01 166 1989	4537408 078
56	F	TOOL, ALIGNMENT	5120 01 166 2003	4537408 079
57	F	TOOL, ALIGNMENT	5120 01 166 1991	4537408 080
58	F	ADAPTER	5120 01 166 1996	4537408 081
59	F	SPACER	5220 01 167 1739	4537408 082
60	F	ADAPTER	5120 01 166 1999	4537408 083
61	F	NUT	5310 01 166 1994	4537408 084
62	F	SPACER, SLEEVE	5365 01 167 1948	4537408 085
63	F	SPACER, SPLIT RING	5220 01 167 1786	4537408 086
64	F	SPACER, SPLIT RING	5220 01 167 1785	4537408 087
65	F	DRAWBAR	2540 01 167 1911	4537408 088
66	F	CYLINDER, HOLE	5130-01-232-5472	4537408 089
67	F	PUMP	4320 01 169 5160	4537408 090
68	F	FRAME	2920 01 167 1781	4537408 091
69	F	TESTER	4910-01-179-7510	4537408 111
70	O	FIXTURE, U BAR	4910-01-170-6691	4537408 109
71	F	TESTER	5220-01-170-4894	4537408 110
72	O	BAR, LIFTING	4910-01-170-6680	4537408 112
73	F	HOSE	4720-01-170-5016	4537408 120
74	F	HOSE	4720-01-170-5015	4537408 130
75	F	CONNECTOR	5120-01-170-4893	4537408 140
76	F	CONNECTOR	5120-01-172-4586	4537408 150
77	F	CONNECTOR	4730-01-170-6730	4537408 160
78	F	CONNECTOR	5120-01-170-4892	4537408 170
79	F	HOSE	4720-01-170-5014	4537408 180
80	F	CONNECTOR	5120-01-170-6678	4537408 190
81	H	PIN, GUIDE	2815-01-210-5708	4537409 005

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (CONTINUED)

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
82	H	PLATE, SUPPORT	4910-01-167-1740	4537409-006
83	H	ASSEMBLY, ADAPTER	5120-01-165-0463	4537409-008
84	H	WRENCH	5120-01-166-5282	4537409-011
85	H	PIN, DRIFT	5120-01-166-2088	4537409-012
86	F	FIXTURE	4910-01-167-1783	4537409-013
87	F	PLATE, LOCK	4910-01-167-1784	4537409-014
88	H	TOOL, INSTALLATION	5120-01-170-6682	116589051400
89	H	TOOL, INSTALLATION	5120-01-170-6683	112589016100
90	H	PIN, DRIFT	5120-01-212-5924	4537409-017
91	H	BRIDGE, MEASURING	5210-01-170-6684	116589002100
92	H	TOOL, ASSEMBLING	5120-01-170-6693	116589095900
93	H	PIN, DRIFT	5120-01-166-2082	4537409-024
94	H	PIN, DRIFT	5120-01-166-2091	4537409-026
95	H	ADAPTER, ARBOR	4910-01-176-9357	4537409-027
96	H	ADAPTER, PULLER	5120-01-166-1987	4537409-030
97	H	PULLER	5120-01-166-1978	4537409-032
98	H	FIXTURE	5120-01-170-4896	4537409-033
99	H	SCREW	5220-01-167-1738	4537409-035
100	H	ADAPTER, PULLER	5120-01-166-1980	4537409-036
101	H	TOOL, ALIGNMENT	5120-01-166-1983	4537409-037
102	H	TOOL, ALIGNMENT	5120-01-166-1984	4537409-038
103	H	PIN, DRIFT	5120-01-166-2079	4537409-039
104	H	PIN, DRIFT	5120-01-166-2080	4537409-040
105	H	PIN, DRIFT	5120-01-166-2081	4537409-041
106	H	FIXTURE	4910-01-167-1737	4537409-042
107	H	HOLDER	5120-01-167-1733	4537409-043
108	H	HOLDER	5120-01-167-1736	4537409-044
109	H	HOLDER	5220-01-166-6011	4537409-045
110	H	GAGE, DISTANCE CHECK	5220-01-179-4072	4537409-046
111	H	GAGE, DISTANCE CHECK	5220-01-166-1981	4537409-047
112	H	WRENCH, SPANNER	5120-01-166-2073	4537409-048
113	H	TOOL, ADJUSTMENT	5120-01-166-1985	4537409-049
114	H	DRIVER	5120-01-166-1982	4537409-050
115	H	GAGE, DISTANCE CHECK	5220-01-166-2005	4537409-051
116	H	TOOL, ADJUSTMENT	5120-01-166-2007	4537409-052
117	F	WRENCH (2 EACH)	5120-01-170-6760	615589000100
118	F	WRENCH	5120-01-196-7728	615589000300
119	H	EXTRACTOR	5120-01-169-5135	615589003300
120	H	PIN, DRIFT	5120-01-177-3050	615589011500
121	F	SOCKET, HEX	5120-12-194-0691	617589001000
122	H	PIN, DRIFT	5120-01-258-1008	617589001500

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (CONTINUED)

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
123	H	TOOL, INSTALLATION	5120-01-170-6681	617589004300
124	H	COUNTERWEIGHT, BALANCING	5120-01-198-7582	617589026300
125	F	PIPE, OVERFLOW	4910-01-224-1918	636589022300
126	O	HANDLE	5120-01-167-1774	6899991-801
127	H	PULLER	5120-01-167-1775	6899991-821
128	O	HANDLE	5120-01-167-1779	6899992-000
129	O	PULLER	5120-01-183-4968	6899992-014
130	O	PULLER	5120-01-167-2000	6899992-097
131	F	PULLER	5120-01-167-1776	6899992-261
132	H	PULLER	5120-01-167-1777	6899992-291
133	O	PULLER	5120-01-183-4967	6899992-413
134	H	EXTRACTOR	5120-01-167-1778	6899994-030

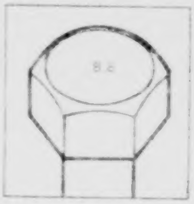
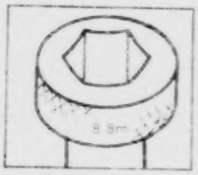
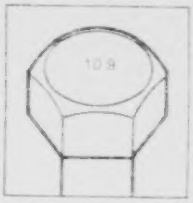
Section IV. REMARKS

REFERENCE CODE	REMARKS
A	ORGANIZATIONAL MAINTENANCE WILL REMOVE INSTALL POWER PACK TO PERFORM BIENNIAL SERVICE ON TRANSMISSION

APPENDIX C

STANDARD CAPSCREW MARKINGS AND TORQUE SPECIFICATIONS

SCREW MARKINGS.

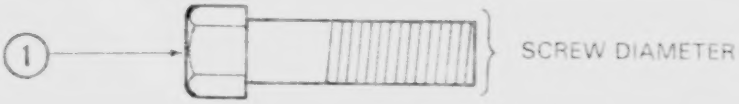
QUALITY OF MATERIAL	THE HIGHER THE NUMBER THE BETTER THE QUALITY	
Screw Grade Number	8.8	10.9
Screw Head Markings	 	

Standard Torque Values.

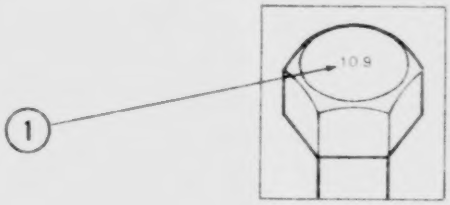
Torque value tables provide standard torque values for specific size and grade of screws used as attaching hardware for components and parts. If specific torque values are not specified in the component paragraphs, tighten the attaching hardware to the torque values listed in the table.

How to determine a Screw Torque Value:

Step 1. Measure and write down diameter of screw (1).



Step 2. Match head screw marking (1) with corresponding markings of the "Property Classes" column in Tables C-1.



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Step 3. Using Tables C-1 match the screw size with its property class. The numbers in the corresponding columns are the torque values of the screw.

NOTE

The screws for the electrical equipment, side doors at the engine hood and the pipe clamp on the airhose from the transfer gearbox may just be torqued by hand.

TABLE C-1. DRY TORQUE VALUES.

SCREW SIZE	PROPERTY CLASSES			
	8.8		10.9	
	TORQUE VALUE			
	nm	lb ft	nm	lb ft
M 5	5.0	3.7	7.5	5.5
M 6	9.0	6.6	12.5	9.2
M 7	14.0	10.3	19.5	14.4
M 8	24.0	17.7	33.5	24.7
M 10	50.0	37.0	70.0	51.7
M 12	80.0	59.0	112.0	83.0
M 14	130.0	96.0	185.0	137.0
M 16	200.0	148.0	280.0	207.0
M 18	285.0	210.0	410.0	303.0
M 20	410.0	303.0	580.0	428.0
M 22	560.0	413.0	750.0	554.0
M 24	740.0	546.0	930.0	686.0

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the M973 CARGO CARRIER. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Insignia Items).

D-2. EXPLANATION OF COLUMNS.

a. Column (1).

Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., ''Use Dry Cleaning Solvent'', item 41, Appendix D).

b. Column (2).

Level. This column identifies the lowest level of maintenance that requires the listed item.

C — Operator/Crew
O — Organizational Maintenance
F — Direct Support Maintenance

c. Column (3).

National Stock Number. This is the National Stock Number assigned to the item. Use it to request or requisition the item.

d. Column (4).

Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5).

Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. The measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	6850-00-181-7929	ANTIFREEZE: PERMANENT ETHYLENE GLYCOL (−65°) INHIBITED (MIL-A-46153) 1 GAL. CONTAINER	GAL.
2	O	6850-00-181-7933	ANTIFREEZE: PERMANENT ETHYLENE GLYCOL (−65°) INHIBITED (MIL-A-46153) 5 GAL. CONTAINER	GAL.
3	O	6850-00-174-1806	ANTIFREEZE: PERMANENT TYPE; ARCTIC GRADE (−90°)(0-1-490) (MIL-A-11755) 55 GAL. DRUM	GAL.
4	C	9150-00-698-2382	DEXTRON II (MIL-L-2104) 5 GAL. CAN	GAL.
5	C	6810-00-543-7415	ETHANOL, DENATURED (O-E-00760) 5 GAL. CAN	GAL.
6	C	9150-01-102-9455	FLUID, BRAKE SILICONE (MIL-B-46176) 1 GAL. PLASTIC CONTAINER	GAL.
7	C	9150-00-935-1017	GAA, GREASE, AUTOMOTIVE AND ARTILLERY (MIL-L-10924) 14 OZ. CARTRIDGE	OZ.
8	O	9150-00-190-0905	GAA, GREASE, AUTOMOTIVE AND ARTILLERY (MIL-L-10924) 5 LB. CAN	LB.
9	O	9150-00-190-0907	GAA, GREASE, AUTOMOTIVE AND ARTILLERY (MIL-L-10924) 35 LB. PAIL	LB.
10	C	9150-00-234-5200	LUBRICANT CHAIN AND WIRE ROPE, CWII (VV-L-751) 5 LB. CAN	LB.
11	C	9130-00-559-2475	KEROSENE (MIL-R-25576) 55 GAL. DRUM	GAL.
12	C	9140-00-286-5295	OIL, FUEL, DIESEL, DF-2, REGULAR (VV-F-800) 5 GAL. CAN	GAL.
13	O	9140-00-286-5296	OIL, FUEL, DIESEL, DF-2, REGULAR (VV-F-800) 55 GAL. DRUM, 16 GAGE	GAL.
14	O	9140-00-286-5297	OIL, FUEL, DIESEL, DF-2, REGULAR (VV-F-800) 55 GAL. DRUM, 18 GAGE	GAL.

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
15	O	9140-00-286-5294	OIL, FUEL, DIESEL, DF-2, REGULAR (VV-F-800) BULK	GAL.
16	C	9140-00-286-5287	OIL, FUEL, DIESEL, DF-1,WINTER (VV-F-800) 5 GAL. CAN	GAL.
17	O	9140-00-286-5288	OIL, FUEL, DIESEL DF-1, WINTER (VV-F-800) 55 GAL. DRUM, 16 GAGE	GAL.
18	O	9140-00-286-5289	OIL, FUEL, DIESEL DF-1, WINTER (VV-F-800) 55 GAL. DRUM, 18 GAGE	GAL.
19	O	9140-00-286-5286	OIL, FUEL, DIESEL DF-1, WINTER (VV-F-800) BULK	GAL.
20	C	9140-00-286-5282	OIL, FUEL, DIESEL, DF-A (ARCTIC) (VV-F-800) 5 GAL. CAN	GAL.
21	O	9140-00-286-5284	OIL, FUEL, DIESEL, DF-A (ARCTIC) (VV-F-800) 55 GAL. DRUM, 16 GAGE	GAL.
22	O	9140-00-286-5285	OIL, FUEL, DIESEL, DF-A (ARCTIC) (VV-F-800) 55 GAL. DRUM, 18 GAGE	GAL.
23	O	9140-00-286-5283	OIL, FUEL, DIESEL, DF-A (ARCTIC) (VV-F-800) BULK	GAL.
24	C	9150-00-971-6643	OIL, LUBRICANT, INSTRUMENT, AIRCRAFT (MIL-L-6085) 8 OZ. CAN	EA.
25	C	9150-01-035-5392	OIL, LUBRICATING, GEAR GO 80/90 (MIL-L-2105) 1 QT. CAN	QT.
26	C	9150-01-035-5393	OIL, LUBRICATING, GEAR GO 80/90 (MIL-L-2105) 5 GAL. CAN	GAL.
27	C	9150-01-035-5390	OIL, LUBRICATING, GEAR GO 75 (MIL-L-2105) 1 QT. CAN	QT.
28	C	9150-01-035-5391	OIL, LUBRICATING, GEAR GO 75 (MIL-L-2105) 5 GAL. CAN	GAL.
29	C	9150-01-152-4117	OIL, LUBRICATING, OE/HDO 15/40 (MIL-L-2104) 1 QT. CAN	QT.
30	C	9150-01-152-4118	OIL, LUBRICATING, OE/HDO 15/40 (MIL-L-2104) 5 GAL. CAN	GAL.

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
31	O	9150-01-152-4119	OIL, LUBRICATING, OE/HDO 15/40 (MIL-2104) 55 GAL. DRUM	GAL.
32	C	9150-00-189-6727	OIL, LUBRICATING OE/HDO 10 (MIL-L-2104) 1 QT. CAN	QT.
33	C	9150-00-186-6668	OIL, LUBRICATING, OE/HDO 10 (MIL-L-2104) 5 GAL. CAN	GAL.
34	O	9150-00-186-6685	OIL, LUBRICATING OE/HDO 10 (MIL-L-2104) 55 GAL. DRUM	GAL.
35	C	9150-00-402-4478	OIL, LUBRICATION, ENGINE, ARCTIC (ICE, SUB-ZERO) (MIL-L-46167) 1 QT.	QT.
36	C	9150-00-402-2372	OIL, LUBRICATION, ENGINE, ARCTIC (ICE, SUB-ZERO) (MIL-L-46167) 5 GAL. CAN	GAL.
37	O	9150-00-491-7197	OIL, LUBRICATION, ENGINE, ARCTIC (ICE, SUB-ZERO) (MIL-L-46167) 55 GAL. DRUM, 16 GAGE	GAL.
38	C	6810-00-356-4936	WATER, DISTILLED: 5 GAL. CONTAINER	GAL.
39	C	6850-00-926-2275	WINDSHIELD WASHER FLUID CLEANING, COMPOUND, WINDOW	GAL.
40	C	9150-00-250-0926	PETROLATUM TECHNICAL (VASELINE, INDUSTRIAL) (VV-P-236)	PT.
41	C	6850-00-664-5685	SOLVENT, DRY CLEANING, SD (P-D-680, TYPE II) 1 QT. CAN	QT.
42	C	6850-00-281-1985	SOLVENT, DRY CLEANING, SD (P-D-680, TYPE II) 1 GAL. CAN	GAL.
43	O	8040-00-833-9563	SEALANT, SILICON RUBBER, RTV (80244), MIL-A-46106, TYPE I, CLEAR, 6 OZ. TUBE	EA.
44	C	7920-00-205-1711	RAGS, WIPING (58536) A-A-531	LB.

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REVERSE OF DA FORM 2028 2

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

TEAR ALONG PERFORATED LINE

DEPARTMENT OF THE ARMY

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PENALTY FOR PRIVATE USE $300

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TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9 (°F – 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° + 32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	**Miles per Hour**	**0.621**

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